

DESCRIPTION

This work consists of constructing a 100 meter section of lime-modified subgrade for a test area on -RP1BD-. The section should be evaluated after final grading by the Geotechnical Engineering Unit to confirm that the soil types needed for testing are present within the test area. The test section is from approximately -RP1BD- station 19+65 to 20+64.

Perform the work covered by this section including, but not limited to treating the subgrade, embankment or natural ground, by adding lime and then mixing while adding water, if required, and shaping, compacting, and finishing the mixture to the required density. Prepare the soil layer to be modified with lime; haul, proportion, spread, and mix the materials within the depth range shown on the plans or as directed by the Engineer; manipulate, compact, and finish the lime-modified soil; correct, repair, and maintain the lime-modified soil. Construct the work in conformity with the typical sections, lines, and grades shown on the plans or as directed by the Engineer and in accordance with these Specifications.

MATERIALS

Refer to Division 10

Item	Section
Lime	1052-3
Water	1024-4

Use soil material which consists of material upon which the pavement is to be placed, existing material upon which the embankment is to be placed, approved borrow material, or a combination of these materials proportioned as directed. Remove all vegetation, roots, or other objectionable matter from the soil, as well as all aggregate or stone larger than 50 mm for the full depth to be modified.

LIMITATIONS

Do not mix the lime with frozen soils or when the soils contain frost. Do not perform lime modification unless the air temperature is 4.4 degrees C in the shade and rising, unless directed otherwise by the Engineer. Apply lime to such areas as can be initially mixed during the day of application. Do not apply lime when wind conditions are such that blowing lime becomes hazardous to traffic, workers, or adjacent property owners, or when excessive loss of lime may occur.

EQUIPMENT

(A) General

Use any combination of machines and equipment to produce the required results that meet the approval of the Engineer. Correct any leakage of fluids and/or materials promptly or the Engineer may order such equipment removed and replaced with satisfactory equipment.

(B) Lime Spreaders

Spread the lime using cyclone, screw type or pressure manifold type spreading equipment capable of applying the lime at a consistent and accurate application rate with as dust control during application. The Engineer may approve the use a "bottom-dump" trailer to spread the lime provided the lime is then uniformly spread with a motor grader.

(C) Water Distribution Equipment

If needed, add water to the soil with a pressure distributor or other suitable equipment capable of uniformly distributing the required amount.

(D) Mixers

Perform mixing with a self-propelled rotary mixer. Use mixing equipment capable of mixing to a compacted depth of at least 0.46 meters. Do not use disc harrows, bucket teeth, motor graders and other equipment for mixing operations, except as directed by the Engineer in areas where the soil types or conditions make mixing with a rotary mixer impractical or where the soil is extremely moist and too soft for effective mixing operations.

(E) Compaction Equipment

Use compaction equipment that is self-propelled. Perform finish rolling with a pneumatic tired roller, pad-foot roller (with or without vibration), or as permitted, a smooth, steel-wheel roller, or a combination of both types.

(F) Scarifying Equipment

When scarification is required, use a grader-scarifier for the initial scarification of the soil. Use equipment capable of scarifying to the full depth of the modified treatment.

PROTECTION AND SAFETY

Take necessary precautions to protect personnel from dust created by the lime application and mixing operation to include eye protection, dust masks and appropriate training.

PREPARATION OF ROADBED

Prior to the addition of any lime to the soil, grade and shape the area to be modified in close conformity to the typical sections, lines, and grades shown on the plans or as directed by the Engineer. Remove all materials such as roots, turf, and rock larger than 50 mm.

SCARIFYING

When required by the method of lime application or soil condition, scarify the soil to the required depth and width, and then partially pulverize by making one pass through the area with a pulverizing rotary mixer. Delete the pulverizing portion of the scarifying operation in areas where the soil types or conditions make pulverizing with a rotary mixer impractical or where the soil is adequately moist and soft for effective mixing operations.

APPLICATION OF LIME

Spread lime only on an area of such size that all mixing operations can be completed in the same day during daylight hours except where the work is to be done at night as required by the contract or approved by the Engineer.

Incorporate the lime into the soil at 2% to 5% by dry weight of soil as needed to achieve the desired soil moisture and modification. or as directed by the Engineer. Distribute the lime at the uniform rate and in such a manner as to reduce the scattering by the wind to a minimum. Mix the lime into the soil within 2 hours after application, or as directed by the Engineer.

No equipment, except that used in lime spreading and soil mixing, will be allowed to pass over the freshly spread lime until it is mixed with the soil.

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MIXING

Immediately after the lime has been spread, mix the lime into the soil to full depth of treatment. Mix the lime into the soil to provide a minimum compacted depth of 0.30 meters, or as directed by the Engineer. A minimum number of mixing passes as directed by the Engineer will be required to ensure uniform incorporation of the lime. Add water as necessary and thoroughly mix with the soil lime mixture so that the mixture contains no less than optimum moisture. Incorporate all of the lime thoroughly and uniformly into the soil layer to the full depth of treatment in such a manner that the result is a homogeneous, friable mixture of soil and lime.

Continue the final mixing until all of the clods are broken down to pass a 25 mm sieve and at least 60% pass a No. 4 sieve exclusive of rock. Add water, if required, during the final mixing to raise the moisture content prior to compaction

COMPACTING, SHAPING, AND FINISHING

Begin compaction of the mixture within 24 hours after completion of the mixing operations. Aerate or moisten the mixture as necessary during compaction operations to maintain the moisture at optimum plus or minus 2%. Compact the full depth of the mixture to a density equal to at least 95% of that obtained by compacting a sample of the soil lime mixture in accordance with AASHTO T99 as modified by the Department.

Copies of these modified procedures are available upon request from Materials and Tests Unit. Accompany the compaction with sufficient blading to eliminate irregularities. If an additional layer of lime-modified soil is to be constructed, a waiting period of at least 24 hours is required.

Perform the final rolling of the completed surface with a pneumatic-tired roller or if permitted a smooth, steel wheel roller.

If the above work is not completed as specified, the entire construction process shall be repeated, as directed by the Engineer, at no additional cost to the Department.

THICKNESS

The compacted thickness of the completed lime-modified soil layer will be determined by measurements made in test holes located at random intervals not to exceed 152 meters. Do not deviate from the measured thickness from that shown on the plans or as directed by the Engineer by more than plus 25 mm.

Where the lime-modified soil layer is deficient in thickness by more than two 50 mm, reconstruct the area of deficient thickness as directed by the Engineer with lime-modified soil having the required thickness at no cost to the Department.

TRAFFIC

Completed sections of the lime-modified soil may be used by construction equipment, provided it has hardened sufficiently to prevent marring or distorting of the surface to a depth of 12.5 mm or less. Repair any ruts, Marring or other distortions with a smooth drum roller or as directed by the Engineer.

MAINTENANCE

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Maintain the lime-modified soil in an acceptable condition until the soil is covered by subsequent layers of base or other suitable material. Include immediate repair of any defects or damage that may occur in construction operations. Perform this work at no cost to the Department and repeat as often as may be necessary to keep the lime-modified soil in an acceptable condition.

MEASUREMENT AND PAYMENT

Lime-modified soil will be measured and paid for as the number of square meters of each layer of lime-modified soil that has been completed and accepted. In determining this quantity, the width of the lime-modified soil will be measured across the top surface of the lime-modified layer. The length will be the actual length constructed, measured along the centerline of the surface of the lime-modified layer.

Lime for Lime-Modified Soil, The quantity of lime to be paid for will be the number of metric tons of lime that has been incorporated into the soil at the required rates. No measurement will be made of any lime added or replaced for corrective measures during construction or for repairing damaged areas. Measurement is to be made in bulk in the truck on certified platform scales or other certified weighting devices.

The quantity of lime will be paid for at the contract unit price per metric ton for "Lime for Lime-Modified Soil".

Payment will be made under:

Pay Item	Pay Unit
Lime-Modified Soil	Square Meter
Lime for Lime-Modified Soil	Metric Ton

A handwritten signature, possibly "M. J. ...", is written vertically. To its right, the date "4/13/11" is written vertically. There is also a faint circular stamp or seal partially visible behind the signature.