

SLAB STABILIZATION

SECTION 625.10 SLAB UNDERSEALING

625.10.1 Description. This work shall consist of stabilizing Portland cement concrete pavement by furnishing, hauling and pumping high density polyurethane or asphalt cement under the concrete slab. This work shall be completed after any required pavement repair and prior to the placement of any new overlay material.

625.10.2 Material.

625.10.2.1 High Density Polyurethane.

625.10.2.1.1 The material shall be a hydrophobic, closed cell, high density polyurethane system with the following physical characteristics and properties:

Property	Requirement
Density, min., per ASTM D 1622	4.0 ± ½ lb/ft ³ (64 ± 8 kg/m ³)
Compressive Strength, min., per ASTM D 1621	80 psi (550 kPa)
Tensile Strength, min.	90 psi (620 kPa)
Volume Change, max.	+5.0 percent
Curing Rate	90 percent of compressive strength within 15 minutes after injection

625.10.2.1.2 The material shall be hydrophobic in the material's component reaction such that the injected product is not significantly compromised by soil moisture or free water under the pavement

625.10.2.1.3 When requested by the engineer, pumping units in service shall perform a product density test by injecting a sample of the unit's polyurethane material into a test cylinder of known volume. The sample's density shall be in accordance with Sec 625.10.2.1.1.

625.10.2.1.4 When requested by the engineer, the contractor, in the presence of the engineer, shall inject the polyurethane material into a container holding 40 gallons (150 L) of ambient temperature water at 70 F (21 C). The resulting product shall demonstrate consistent, closed cell polyurethane material.

625.10.2.1.5 All stored polyurethane material shall be handled in accordance with the manufacturer's recommendations.

625.10.2.2 Asphalt Cement.

625.10.2.2.1 Asphalt cement material shall meet AASHTO M238 standards with a minimum flash point of 500 F (260 C). The Contractor shall provide a supplier certification with each shipment in accordance with Sec 1015.3.1.

625.10.3 Construction Requirements.

625.10.3.1 General.

625.10.3.1.1 Pavement stabilization operations will not be allowed when daytime temperatures are below 35 F (2 C) or if the subgrade is frozen.

625.10.3.1.2 A hole pattern shall be submitted for approval at least 7 days prior to starting slab stabilization operations. Drilled holes shall be a maximum of 1 1/2 inches (38 mm) in diameter, drilled smooth, vertical and round. Holes drilled with a break out in excess of 1 1/2 inches (38 mm) outside the hole diameter will be unacceptable.

625.10.3.1.3 The Contractor shall provide equipment capable of detecting slab lift to measurements of 0.001 inch (0.03 mm). Pavement lifted in excess of 0.125 inch (3 mm) or pavement cracked as a result of the undersealing will be unacceptable.

625.10.3.1.4 Proof of full undersealing, such as material seeping from joints, cracks, or edges; vertical slab movement; or other visual indication, as determined by the engineer, will be required prior to acceptance. When required, deflection testing shall be performed in accordance with MoDOT Test Method TM 64. No testing shall be performed if the slabs are beginning to lock-up. Tests shall not be performed during Spring thaw conditions or when the subgrade is frozen.

625.10.3.1.5 Undersealing materials shall not enter into gutters or closed drainage systems. Residue shall not be spread within 100 feet (30 m) of any streams, lakes or other open bodies of water or within 15 feet (4.5 m) of a water filled ditch. All removed material shall be disposed of in an environmentally acceptable manner in accordance with all Federal, State, and local regulations.

625.10.3.1.6 All drill tailings, spilled material, and other debris shall be cleaned up at the end of each working day or before the lane is opened to traffic.

625.10.3.1.7 The drill holes shall be filled flush with the pavement surface using a material to match the existing surface.

625.10.3.1.8 The Contractor shall supply certification for the accuracy of the method used to measure the amount of material used on the project.

625.10.3.2 High Density Polyurethane.

625.10.3.2.1 Injection nozzles shall prevent leakage during injection and shall be removed at completion of the injection or driven into the injection hole to a minimum depth of 1 1/4 inches (31 mm) below the pavement surface.

625.10.3.2.2 Any excessive material on the pavement surface shall be removed from the area and the holes shall be sealed with polyurethane material or in accordance with Sec 625.10.3.1.7.

625.10.3.2.3 The pavement shall not be open to traffic until a minimum of 30 minutes after pumping operations have ceased.

625.10.3.3 Asphalt Cement.

625.10.3.3.1 Asphalt cement shall be heated to a temperature between 380 F (193 C) and 450 F (232 C) before pumping operations begin.

625.10.3.3.2 Pumping operations shall cease when asphalt cement seeps from cracks and joints. Pumping shall not resume until visible asphalt cement has congealed.

625.10.3.3.3 The Contractor shall provide adequate shielding to ensure passing traffic is not sprayed by asphalt cement.

625.10.3.3.4 The pavement shall not be open to traffic until a minimum of 30 minutes after pumping operations have ceased.

625.10.4 Method of Measurement.

625.10.4.1 High density polyurethane material shall be measured to the nearest pound (kg).

625.10.4.2 Asphalt cement shall be measured to the nearest gallon (4 L).

625.10.4.3 Measurement of testing for deflection will be per joint, crack or pavement repair patch per traffic lane in which testing is performed. Testing prior to undersealing and testing after undersealing will be measured separately.

625.10.5 Basis of Payment. The accepted quantities of undersealing material and deflection testing quantities will be paid for at the contract unit price. Payment will be considered full compensation for all labor, equipment and material necessary to complete the described work.

SECTION 625.20 SLAB JACKING

625.20.1 Description. This work shall consist of injecting high density polyurethane under a sunken section of concrete pavement and raising it back to the correct profile for an acceptable ride and positive drainage.

625.20.2 Material.

625.20.2.1 High density polyurethane used for slab jacking shall meet the requirements of Sec. 625.10.2.

625.20.2.2 The material used in grouting shall consist of a mixture of Portland cement, fly ash and water proportioned as specified or as approved by the engineer. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Fly Ash	1018
Cement, Type I, II or III	1019
Water	1070

625.20.2.3 Grout shall meet the following minimum requirements:

(a) Flow cone efflux time shall be 10 to 16 seconds, as determined in accordance with ASTM C 939.

(b) The minimum design strength at minimum efflux time shall be 600 psi (4.1 MPa) at seven days, determined in accordance with ASTM C 942, with the exception that storage of compressive specimens after 24 hours shall be placed in a 100 percent humidity cabinet.

625.20.2.4 At least three weeks prior to the beginning of this work, the contractor shall submit the proposed mixture to the engineer. The submittal shall include the mix design, source and type of all material test results of the grout showing one-day, three-day and seven-day compressive strengths, efflux time, time of initial and final set by the Gilmore needle in accordance with ASTM C 266 and time delayed to molding specimens after mixing grout. The time delay between mixing and molding will be the maximum holding time permitted in the field. Sufficient

quantities of all mixture components to permit laboratory verification of the grout properties listed herein shall accompany the mix design submittal. Approximately 10 pounds (5 kg) of Portland cement and 30 pounds (14 kg) of fly ash shall be furnished.

625.20.3 Construction Requirements. Construction requirements shall be in accordance with Sec 625.10.3.1 and specifically as follows.

625.20.3.1 General.

625.20.3.1.1 The contractor shall establish a finish target profile using an elevation measuring device or string line. Each profile shall be accepted by the engineer prior to work being performed at that location.

625.20.3.1.2 Pumping operations shall cease when the slab has achieved the target profile. The Contractor shall provide equipment capable of detecting slab lift to measurements of 0.001 inch (0.03 mm). Pavement lifted in excess of 0.125 inch (3 mm) over the accepted profile or pavement cracked as a result of the slab jacking will be unacceptable.

625.20.3.1.3 The engineer may require the contractor to verify positive drainage on the lifted slab by flooding the surface area.

625.20.3.2 High Density Polyurethane. Construction requirements shall be in accordance with 625.10.3.2.

625.20.3.3 Cementitious Grout.

625.20.3.3.1 Any admixtures used shall be incorporated in accordance with the manufacturer's recommendations. Admixtures may be added by hand methods. Admixtures shall be measured within a tolerance of plus or minus three percent of the required quantity.

625.20.3.3.2 Personnel, scales and equipment necessary for calibrating the proportioning devices and for verifying the accuracy of proportions shall be furnished by the contractor and shall be available at all times. All equipment shall be calibrated by the contractor in the presence of the engineer, and subject to approval from the engineer. Verification of the accuracy of the scales and other dispensing methods may be required at any time deemed necessary by the engineer, but will be performed at least once each day of operation.

625.20.3.3.3 Weight proportioning (mass determination) and volume proportioning equipment, accuracy, calibration and verification shall be in accordance with Sec 501.

625.20.3.3.4 Grout may be re-tempered with water. Prior to re-tempering the grout, the engineer shall be notified.

625.20.3.3.5 The cement and fly ash for grout shall be measured by weight (mass) or volume. The quantity of cement and fly ash to be used shall be calculated from the approved mix design. Batches not containing the proper quantities of material will be unacceptable.

625.20.3.3.6 Filling holes shall be in accordance with Sec. 625.10.3.1.7.

625.20.3.3.7 The contractor may disperse residue onto unpaved shoulders, adjacent roadside embankments or median ditch areas of divided highways where the residue runoff can percolate into the soil, unless specified otherwise in the contract. The spread rate shall not generate surface runoff. If surface runoff occurs at a grinding location, the contractor shall remove the residue to an approved location at the contractor's expense.

625.20.3.3.8 Traffic shall not be permitted on the undersealed pavement until three hours after the end of pumping operations, and after all drill holes have been plugged.

625.20.4 Method of Measurement.

625.20.4.1 High density polyurethane material shall be measured to the nearest pound (kg).

625.20.4.3 Portland cement will be measured to the nearest pound (kg).

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625.20.4.4 Fly ash will be measured to the nearest pound (kg).

625.20.4.5 Measurement of testing for deflection will be per joint, crack or pavement repair patch per traffic lane in which testing is performed. Testing prior to undersealing and testing after undersealing will be measured separately.

625.20.5 **Basis of Payment.** The accepted slab jacking material, and deflection testing quantities will be paid for at the contract unit price. Payment will be considered full compensation for all labor, equipment and material necessary to complete the described work.