

## SECTION 679—SLAB STABILIZATION

**679.1 DESCRIPTION**—This work is the filling of voids beneath existing rigid base courses or pavements at locations as directed.

### 679.2 MATERIAL—

(a) **Cement.** Section 701

(b) **Water.** Section 720.1

(c) **Admixtures.** Section 711.3

A multiphase wetting agent and an expansive agent may be used. Use an accelerator if required.

(d) **Pozzolan.** Section 724.2

(e) **Rapid Set Concrete Patching Materials.** Supplied by a manufacturer listed in Bulletin 15. Use within the shelf life and temperature limitations set by the manufacturer.

(f) **Mix Design.** Submit a mix design for review and acceptance to the District Engineer before starting work. Include with the submittal independent laboratory testing showing 1-, 3-, and 7-day compressive strengths, flowability, shrinkage and expansion results, and the time of initial set. Proportion the mix as follows:

1 part cement (by volume)

3 parts pozzolan (by volume)

Admixtures—if required and accepted

Water—an amount such that the time of efflux is within 10 to 15 seconds (ASTM C 939)

Furnish mix with an expansion of 0% to 10% (PTM No. 515), an initial setting time of one to six hours (AASHTO T 131) and bleeding which is no more than 2.5% of the volume (PTM No. 515).

A 7-day compressive strength of 4.8 MPa (700 psi) minimum is required, based on the average of five test cylinders (PTM No. 521).

Submit a new mix design if the source of any material is changed.

### 679.3 CONSTRUCTION—

(a) **General.** Do not proceed with this work until it can be satisfactorily shown that qualified personnel are available at the job site who have had successful experience with this type of work.

Do not perform work when day time temperatures are below 2 °C (35F) or if the subgrade and/or base course material is frozen.

(b) **Deflection Testing.** If preliminary testing has not been performed, test each joint and crack as directed, and as follows:

Do not perform testing if air temperature exceeds 21 °C (70F). Do not test during spring thaw conditions or when subgrade is frozen.

Furnish and maintain four gauges capable of detecting slab movement to 0.03 mm (0.001 inch). Use gauge mounts approved by the Engineer. Furnish and maintain a vehicle having a dual-tire single axle with an 80 kN (18,000 pound) single axle load. Verify by measuring the force of gravity upon a certified scale.

Position two gauges as shown on the Standard Drawings. Zero both gauges to the pavement surface with no force on the slab on either side of the joint or crack.

Slowly move the test vehicle into position and stop when the test axle is in the position shown on the Standard Drawings for the loaded Approach Slab Condition. Read both gauges and record the results.

Move the test vehicle slowly across the joint and stop it in the position shown on the Standard Drawings for the loaded Leave Slab condition. Read both gauges and record the results.

Repeat this procedure at every transverse joint and crack.

Stabilize all joints or cracks that have a loaded slab corner deflection of 0.5 mm (0.020 inch) or more and a joint efficiency at 65%\* or more.

Patch and stabilize all joints or cracks that have a loaded slab corner deflection of 0.5 mm (0.020 inch) or more and a joint efficiency of less than 65%.

Joint efficiency is defined as follows:

$$JE = \frac{\text{Unloaded Slab Corner Deflection}}{\text{Loaded Slab Corner Deflection}} \times 100$$

\* Use the highest Loaded Slab Corner Deflection and the lowest joint efficiency at each joint or crack.

**(c) Equipment.**

**1. Grout Plant.** Provide the following: A satisfactory positive displacement cement injection pump and a satisfactory mixing machine; capable of operating at a minimum speed of 800 rpm and a maximum speed of 2000 rpm.

**2. Water Tanker.** Supply water from a water truck with adequate capacity and pressure for delivery to the grout machine.

**3. Drill.** Provide generator, core drill, and diamond-tip core barrels or other satisfactory equipment capable of drilling the grout injection holes through the pavement and base material; and equipment in satisfactory condition and operated in a manner such that holes are smooth, vertical, and do not break out the bottom of the slab.

**4. Vertical Movement Testing.** Supply satisfactory equipment to measure slab lift, capable of detecting simultaneously the lift of the pavement edge or of any 2 outside slab corners adjacent to a joint and the adjoining shoulder. Use equipment with a capability of making these measurements to 0.03 mm (0.001 inch).

**5. Miscellaneous.** Provide necessary hoses, valving and valve manifolds with positive cutoff and bypass provisions to control pressure and volume, pressure gauges with gauge protectors, expanding packers or hose for positive seal during grout injection, hole washing tools, drill steel, bits, and any other miscellaneous tools required.

**(d) Procedure.**

**1. Drilling Holes.** Drill grout injection holes in the pattern shown on the Standard Drawings, or as directed. Drill holes not larger than 38 mm (1.5 inches) in diameter, vertical and round and to a depth sufficient to penetrate any stabilized base.

**2. Mixing.** Accurately measure the dry materials by mass, if in bulk, or provide packaged in uniform volume sacks. Batch with water through a meter or scale, with a totalizer for the day's consumption.

Do not hold mixed material in the mixer or injection pump sump for more than one hour after mixing. Waste material held for longer times.

Make flowability measurements at least two times during each work shift.

**3. Void Filling.** During the filling operation, use a positive means of monitoring lift as specified in Section 679.3(c)4. Upward movement of the pavement greater than 1.3 mm (0.05 inch) will not be permitted. Lower an expanding rubber packer or hose, connected to the discharge from the pump, into the hole. Do not extend the discharge end of the packer or hose below the lower surface of the concrete pavement. Pump each hole until maximum pressure is built up or material is observed flowing from hole to hole. Maximum pressure exceeding 1.4 MPa (200 psi) will not be permitted, unless otherwise directed. Monitor the pressure in the grout line. Protect the gauge from the grout slurry. Allow the water, displaced from the void structure by the grout, to flow out freely. Excessive loss of the grout through the cracks, joints or from back pressure in the hose or in the shoulder area will not be permitted.

**4. Correcting Panel Displacement.** Grind pavement, which has been raised in excess of the 1.3 mm (0.05 inch) allowable tolerance, to the correct grade. Grind in accordance with [Section 514.3](#); except, grind into the high slab.

**5. Radial Cracks.** Radial cracks spreading outward from the grout injection holes indicate poor workmanship or improper methods. Stop work until the cause is determined and corrected.

**6. Transverse Cracks.** If transverse cracks develop between adjacent grout injection holes, replace the entire slab at no cost to the Department.

**7. Hole Patching.** Upon completion of the work, patch drill holes full depth with a rapid set, non-shrink concrete patching material. Strike patches flush with the surface of the surrounding pavement.

**(e) Retesting.** 24 hours after grouting and prior to acceptance, retest each stabilized joint or crack as specified in Section 679.3(b). Regrout slabs which deflect 0.5 mm (0.020 inch) or more and retest. The Engineer may accept any slab which continues to show movement, in excess of that specified, after two properly performed groutings; or direct the removal and replacement, with a full depth concrete patch, in accordance with [Section 516](#) and paid for separately.

**(f) Opening to Traffic.** Do not open to traffic for a minimum of 12 hours after grouting operations have been completed.

**679.4 MEASUREMENT AND PAYMENT—**

**(a) Deflection Test.** Each

**(b) Holes Drilled.** Each  
Includes patching of the hole.

**(c) Grout Material.** Kilograms of Cement (Bags of Cement)  
Includes an accelerator, if required. For each 1.5 m (5 linear feet) of radial cracking, as specified in Section 679.3(d)5., the pay item will be reduced by 42.6 kg (one bag) of cement. No payment will be allowed for any wasted grout material.