

STATE

OF

TENNESSEE

(Rev. 09-30-2015)

(Rev. 10-19-2015)

(Rev. 6-21-21)

January 1, 2021

SPECIAL PROVISION

REGARDING

FULL DEPTH AND PARTIAL DEPTH CONCRETE PAVEMENT REPAIR

(CLASS X-HIGH EARLY STRENGTH)

Description

This work shall consist of performing full depth or partial depth concrete pavement repair in reasonably close conformity with the design set out on the plans or established by the Engineer. The standard specification **501** shall apply except as revised.

Materials

Coarse aggregate shall be crushed stone, crushed slag, or crushed gravel meeting the requirements of **903.03** and the grading requirements of **903.22** for size #57 aggregate; all other materials shall conform to **501.02**.

The cement used in this construction shall be a Type I, Type III, or a rapid setting cement listed on the Department's Producer List.

Chemical admixtures shall meet the requirements of **921.06** and be approved by the Department.

Partial Depth patching material shall be a concrete mixture meeting the requirements below or an approved non-shrink grout or epoxy concrete from the Department's Qualified Products List (QPL).

Dowel bars and tie bars shall be epoxy coated in accordance with ASTM D 3963, **907.02**, and listed on the Department's QPL. The bar sizes shall be determined from the Standard Drawings. Epoxy used to adhere dowel and tie bars shall be approved by the Department.

A. Proportioning

A workable concrete mix with a minimum 28 day compressive strength of 3000 psi. The concrete mix will utilize an approved cement, #57 aggregate and natural sand conforming to **501.02**, and having a slump not greater than 2 inches shall be required. The slump may be increased to a maximum of 6 inches when using an approved high range admixture. The mixture shall have a maximum water to cement ratio of 0.40 including admixtures. The

percentage of air entrained in the mix shall be five percent, with a tolerance of plus three or minus two percentage points.

The mixture shall have a minimum compressive strength of 2500 psi within 6 hours. However, the time frame of 6 hours may be reduced depending on the mode of operation. Submit to the Engineer in writing the time frame in which the minimum compressive strength will be attained. Obtain the minimum compressive strength prior to opening the pavement to traffic.

B. Sampling and Testing

The concrete shall be tested in accordance with **501**. Prior to the start of the project and before any concrete is placed, batch, and mix a one-cubic yard trial batch of mix. The trial batch shall be made using the same equipment and procedures as is to be used on the project. The Department will test the trial batch for slump and air content and test cylinders shall be made. A minimum strength of 2500 psi within the designated time frame shall be required on the test cylinders. If the trial batch does not produce the required results, adjustments shall be made by the Engineer and a new trial batch shall be required. During the progress of the work, if the Engineer deems necessary, additional trial batches may be required. No direct payment will be made for the trial batching.

The Engineer will perform tests for slump and air content as often as deemed necessary to maintain uniform, quality concrete.

C. Acceptance

The concrete shall be tested and accepted in accordance with **501** and Standard Operating Procedure 1-1. Perform quality control tests for slump and air content as often as deemed necessary to maintain uniform, quality concrete.

Equipment

Equipment and tools necessary for handling materials and performing all parts of the work shall conform to **501.04**.

Construction Requirements

The construction shall conform to the requirements of **501** in so far as the requirements do not conflict with the requirements herein specified unless otherwise directed by the Engineer.

Full depth and partial depth concrete pavement repair shall be performed as shown on the plans. If the depth of partial depth concrete pavement repair (Spall Repair) exceeds one third of the slab thickness, the pavement area to be repaired shall be removed and replaced full depth, to the dimensions shown on the plans for Concrete Pavement Replacement, or as directed by the Engineer.

A. Sawing

The perimeter of full depth concrete repairs shall be sawed full-depth prior to lifting. The non-joint perimeter of partial-depth concrete repairs shall be sawed at least 2 inches below the surface prior to removal.

B. Removal

Full depth repair slabs or portions of slabs shall be removed by lifting, unless the slab is deteriorated such that lifting is not possible. An adequate lifting machine will be required to minimize damage to the sub-base. Any soft base material shall be removed and replaced with specified materials and methods. All loose base material shall be compacted. The method of removal shall not spall or damage any existing concrete pavement.

For partial depth repairs, the area adjacent to the spall area shall be sounded to determine the limits of partial depth repair. The hammer for chipping shall be a maximum of 30 lbs. Lighter, 15 lb hammers are preferable for better depth control.

The exposed faces of concrete shall be sandblasted free of loose particles, oil, dust, traces of asphaltic concrete and other contaminants before placing patching materials.

The sandblasted faces shall be airblasted using clean dry, oil-free air at a minimum of 2.6 CY per minute and at least 90 PSI nozzle pressure.

Patching material for partial depth repairs may be mixed on site in small mobile drums or paddle mixers. Follow all manufacturer recommendations for proprietary materials.

C. Joints

For partial-depth repair, an approved compressible insert shall be placed in joints to ensure that concrete does not span the joint. The insert must extend at least 1 inch below the bottom of the patch and at least 3 inches beyond the patch limits. Sawing the joint shall be completed, as needed, to allow installation.

Joints shall be constructed for full depth repair and shall conform to **501.15**. Dowel and tie bar holes shall be drilled in the locations shown on the Plans or reference drawings. After drilling, the hole shall be cleaned either pneumatically or with a wire brush. A sufficient amount of epoxy shall be inserted at the back of the drill hole and the bar inserted with a twisting motion to assure uniform distribution of epoxy. Excess epoxy shall be removed.

D. Finishing and Curing

After vibrating the concrete in place, the full depth patch shall be finished using a vibratory screed parallel to the centerline such that it meets the existing grade and profile.

Final surface texture shall match the surrounding pavement unless grinding is planned.

Curing shall be completed in accordance with **501.18.C**.

Partial depth repairs shall be vibrated, without dragging the vibrator, to eliminate voids. Finishing shall progress from the center outwards to the edges.

E. Opening to Traffic

Traffic shall not be allowed on the newly placed concrete until a test cylinder break of at least 2500 psi is attained.

F. Sealing Joints

After the patch has gained sufficient strength, clean, saw, and seal the joints according **501.20** and manufacturer's recommendations.

Unsatisfactory Work

Repaired areas which do not produce a relatively smooth riding surface, show excessive shrinkage, cracking, do not produce an adequate bond to the adjacent slab or is lower than existing grade and profile shall be removed and replaced at no additional cost to the Department.

Repaired areas which do not produce a relatively smooth riding surface and are higher than existing grade and profile may have corrective grinding performed with equipment meeting **604.27.C** at no additional cost to the Department.

Method of Measurement

The Department will measure Full Depth Portland Cement Concrete Pavement Repair by the cubic yard in accordance with **109**.

The Department will measure Partial Depth Portland Cement Concrete Pavement Repair (Spall Repair) by the square yard in accordance with Section **109**.

Spall Repair areas that the depth of repair exceeds one third of the slab thickness will be become a full depth repair area and shall only be measured by the cubic yard as Full Depth Portland Cement Concrete Pavement Repair

The Department will measure Sawing Concrete Pavement (Full Depth) by the linear foot.

The Department will measure Load Transfer Dowels and the Transverse Dowel Bars by each installed.

No measurement for payment will be made for removing and disposing of the existing Portland cement concrete pavement, for removing and disposing of soft base material, drilling holes, grouting, joint materials, etc., required in conjunction with the specified concrete pavement repair; and the cost for this work shall be included in the price bid for other items.

Basis of Payment

The Department will pay for accepted quantities, complete in place, at the contract prices as follows:

Item No.	Description	Unit
502-03.25	FULL DEPTH PCC PAVEMENT REPAIR HIGH EARLY	C.Y.
502-03.26	PARTIAL DEPTH PCC PAVEMENT REPAIR HIGH EARLY	S.Y.
502-04.01	SAWING CONCRETE PAVEMENT (FULL DEPTH)	L.F.
502-04.02	LOAD TRANSFER DOWELS	EACH
502-04.03	TRANSVERSE DOWEL BARS	EACH

Such payments will be full compensation for performing all operations, furnishing all materials, equipment, tools, labor, and incidentals necessary to complete the work.