

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 506

CONCRETE PAVEMENT REPAIR

DELETE ENTIRE SECTION AND REPLACE WITH THE FOLLOWING:

506.1 - DESCRIPTION:

This work consists of the removal and replacement of deteriorated concrete pavement and patches, and replacing subbase material where required, at locations as shown on plans or as specified by the Engineer.

The following is a description of each patch type:

i. Jointed Concrete Pavement Patch, Type I:

Patching shall consist of full depth, full lane width concrete pavement repairs equal to or greater than 6 feet (1.8 meters) in length. Type I patches shall be constructed in accordance with the Concrete Repair Details in the plans.

ii. Jointed Concrete Pavement Patch, Type II:

Patching shall consist of partial depth concrete pavement repairs that extend no deeper than one-third the slab thickness and extend no more than one-half the lane width. Type II patches shall be constructed in accordance with the Concrete Repair Details in the plans.

506.2 - MATERIALS:

Materials shall meet the requirements of section 501 or 601, and as follows:

MATERIAL	SECTION OR SUBSECTION
Subbase	307
Portland Cement Concrete	501 or 601
Epoxy-Coated Dowel Bars	709.15
Tie Bars and Hook Bolts	709.1
Joint Sealer	708.3, 708.4
Accelerating Admixtures	707.13
Curing Materials	707.6-707.10

An approved epoxy grout shall be used to firmly anchor dowel bars in 30 minutes. Bond breaker material shall be supplied from an approved source. Acceptable bond-breaking materials include white pigmented curing compound.

506.3 - PROPORTIONING:

Portland cement concrete for patching concrete pavement shall meet the requirements of Section 501 or Class B concrete as specified in Section 601, except that it shall be shown by compressive strength tests that the concrete mix shall attain 2,000 psi (13.8 Mpa) prior to the time at which the pavement will be opened to traffic. Prior to the start of work, the Contractor shall submit the mix proportions and recent compressive strength test data for the specified age at which the concrete is to be opened to traffic.

506.4 - TESTING:

All testing shall be in accordance with section 501. The Contractor shall fabricate a minimum of nine field cured compressive strength cylinders for each 24 hour period of operation. When the average strength of three of these cylinders, representing the concrete placed, indicate that the concrete has attained the required strength for opening to traffic, that concrete may be put into service. These cylinders shall represent concrete produced from the batch from which they were fabricated and, if applicable, concrete from previous batches also. These cylinders will not represent any concrete which was placed after the time that they were fabricated.

506.5 – EQUIPMENT AND TOOLS:

Equipment and tools shall be in accordance with section 501 unless noted otherwise. Saw cutting equipment shall be capable of sawing neat vertical faces along the patch boundaries. The use of a carbide-toothed wheel saw shall not be permitted for sawing the patch boundaries. A carbide-tipped wheel saw may be used for additional saw cuts provided that a minimum 3-inch (75 mm) clearance from the sawed boundary is maintained.

506.6 – CONSTRUCTION METHODS:

506.6.1 – Removal of Existing Pavement: Designated defective pavement shall be removed full depth, and undisturbed portions of the existing pavement adjacent to the area to be patched shall be left with straight vertical sides.

The existing pavement to be removed shall be sawed full depth along the transverse and longitudinal boundaries, including the lane and shoulder/lane joints as shown on the plans or as directed by the Engineer. Additional saw cuts inside the patch boundaries will be permitted to facilitate the concrete removal operation.

Concrete sawn full depth to be removed shall be lifted out by means of chains, lift-pins, or other approved devices. The breaking of concrete in-place shall not be permitted. During the removal operations, utmost care shall be exercised to minimize disturbance and damage to the base material, and the adjacent pavement and shoulder.

506.6.2 – Conditioning Existing Subbase: Prior to placing concrete in the repair area, any subbase material that is disturbed below the desired level of cleanout shall be removed and the patch area compacted to the satisfaction of the Engineer. Unsuitable subbase material, concrete, reinforcing steel, and any other debris shall become property of the Contractor and shall be legally disposed. The Contractor shall replace the removed subbase material with concrete integral to pavement replacement up to a maximum 1-inch (25 mm) depth. In the event that soft areas are encountered in the subbase or subgrade, the Engineer may require replacement of subbase and subgrade in accordance with section 307 subbase material and installation of underdrains. When subbase or subgrade material is replaced, it shall be brought to grade and compacted to the satisfaction of the Engineer. The cost of installation and method of installation of underdrains shall be as per section 606.

506.6.3 – Placing Concrete: Unless otherwise approved by the Engineer, all excavated areas shall be patched the same day that they are excavated. The excavated area shall be thoroughly cleaned of loose material and debris and moistened prior to the placement of concrete.

Existing pavements shall not be removed if such removal will result in concrete being placed when the ambient air temperature is below 32° F, unless approved by the Engineer. The concrete temperature at the time of placement shall not be less than 70° F and not more than 95° F, unless approved by the Engineer.

Concrete shall be deposited in the excavated area, and the free fall shall not be more than 3 feet (1 m). If the concrete does not fall into its final position in the patch, it shall be moved by means of shovels; raking is prohibited. The concrete shall be worked with tampers, spades, or other tools to completely fill the patch area. Maximum effort will be used to ensure that the area beneath the existing concrete pavement is completely filled. Internal vibration shall be used.

Following the placing of the concrete, the surface will be struck off to a finished grade and floated to a smooth finish. Finishing of the plastic concrete shall conform to the requirements of Section 501.12 of the Specifications, except that the final concrete surface shall be textured similar to that of the adjoining pavement.

506.6.4 – Straightedge Checking and Surface Correction: During finishing operations, deviations in adjacent lanes which are also to be repaired shall not be transferred to the new construction. The Contractor shall furnish and use straightedges to check the surface tolerance. For patches 10 feet (3 m) or more in length, a 10 foot (3 m) straightedge shall be used. Shorter straightedges shall be used for patches less than 10 feet (3 m) in length.

The minimum length straightedge shall be 6 feet (1.8 m). Section 501.12.6 shall govern except that the shorter straightedges shall be used for shorter patches.

506.6.5 – Curing: Immediately after straight edging and texturing, the concrete shall be cured in accordance with Section 501.14. Where early opening to traffic is required, insulation mats or blankets may be used over the repairs during curing in order to accelerate strength gain.

506.6.6 – Sealing Joints: When patching two lanes simultaneously, the longitudinal joint shall be reestablished by sawing. Joints shall be sealed with silicone unless otherwise approved by the Engineer. Joint sealing shall be done in accordance with Sections 509 and 510.

506.6.7 – Repair of Adjacent Shoulders: Within 24 hours after completion of a patch area, any adjacent shoulders damaged during pavement repair operations shall be reconstructed in accordance with the requirements of the applicable section of the specifications to match the finished shoulder grade and to the satisfaction of the Engineer. In the event traffic is to be permitted on the patch area prior to reconstruction of the shoulder, the Contractor shall first make such temporary repair to the shoulder as is necessary to avoid any hazardous condition.

506.6.8 – Specific Construction Methods: Construction methods specific to each repair type are noted in the following sections.

506.6.8.1 – Type I Repairs: Where the existing joint dowel assembly is to be removed, the existing concrete shall be saw cut full depth and removed a minimum of 1 foot (300 mm) on either side of existing transverse joints. Minimum length of removal shall be 6 feet (1.8 m) in accordance with that shown in the WVDOH Concrete Repair Details.

Over sawing into the adjacent slabs or shoulder shall be kept to the minimum amount necessary to ensure that full depth cuts in the corners have been achieved. All over sawing shall be cleaned and filled with joint sealant.

Any areas damaged during concrete sawing and removal operations shall be repaired to the satisfaction of the Engineer by extending the patch boundary or repairing spalls at the Contractor's expense. Spalls greater than ¼ inch (6 mm) wide and 2 inches (50 mm) long and more than ½ inch (13 mm) deep below the pavement surface shall be repaired using an approved epoxy mortar.

An approved bond breaking material shall be placed at the longitudinal joint for Type I patches as shown in WVDOH Concrete Repair Details.

Where dowels are required, holes slightly larger than the diameter of the dowels shall be drilled 9 inches (225 mm) into the face of the existing slab starting 6 - 12 inches (150 – 300 mm) from either edge and then on 12 inch (300 mm) centers. There shall be four dowels placed in from each pavement edge for a total of eight per joint. The holes shall be located at a depth as shown in the WVDOH Concrete Repair Details. The dowels shall be carefully aligned (within ¼ inch (6 mm)) with the direction of the pavement and parallel to the plane of the surface. An approved quick setting, non-shrinking mortar or an approved high viscosity epoxy shall be used to anchor the dowels in the holes. The holes shall be completely filled around the dowels so as to minimize vertical movement of the dowels and ensure that the dowels are permanently fastened to the existing concrete. The epoxy or grout is to be put into the hole in sufficient quantity so that when the bar is inserted, the material completely fills the annular space around the bar. A grout retention ring shall be used as shown in the WVDOH Concrete Repair Details.

The surface edges of all patches shall be tooled, formed and/or sawed, and cleaned to result in a properly dimensioned reservoir for sealant. All transverse and longitudinal joints at pavement repair locations shall be filled with silicone in accordance with manufacturer's recommendations unless otherwise approved by the Engineer.

506.6.8.2 – Type II Repairs: Partial depth patches shall be sawed a minimum depth of 2 inches (50 mm) around the perimeter of the patch area to provide a vertical face at the edges. Concrete within the patching area shall be broken out with a pneumatic hammer not heavier than a 35-pound class or by other methods approved by the Engineer. Edge spalls greater than ¼ inch (6 mm) wide and 2 inches (50 mm) long and more than ½ inch (50 mm) deep below the pavement surface shall be repaired using an approved epoxy mortar. The area of failure shall be removed by equipment that will not damage the adjacent sound pavement. The exposed faces of

the concrete shall be free of loose particles, oil, dust, and other contaminants before placement of patch material. Prior to placement of the concrete patch, all exposed concrete faces within the patched area shall be coated with an approved epoxy bonding compound per the manufacturer's recommendations. All residues shall be removed just prior to placement of the concrete bonding agent.

506.7 – RIDE ACCEPTANCE:

As soon as the concrete has hardened sufficiently, the pavement surface shall be tested with a 10 foot (3 m) straightedge. The straightedge shall be placed in successive positions parallel to the road centerline, matching existing wheel paths. Areas showing deviations (either high or low) of more than ¼ inch (6 mm) in 10 feet (3 m) shall be marked and corrected down with approved grinding equipment to an elevation where the surface deviations will not be more than ¼ inch in 10 feet (3 m).

In the event that the deviation cannot be corrected to ¼ inch (6 mm) or less (either high or low) in 10 feet (3 m), the areas shall be removed and replaced at the discretion of the Engineer and at the Contractor's expense. All areas or sections so removed shall not be less than 6 feet (1.8 m) in length or less than full width of the traffic lane involved. Any remaining portion of the slab adjacent to the joints that is less than 6 feet (1.8 m) in length shall also be removed and replaced. Where concrete repairs are made that are to be overlaid, the smoothness criteria is waived for the concrete repair.

506.8 – METHOD OF MEASUREMENT:

The quantity of concrete pavement repair to be paid for will be the number of square yards (meters) complete in place and accepted.

506.9 – BASIS OF PAYMENT:

The quantity of concrete pavement repair, determined as provided above, will be paid for at the contract unit price and shall constitute full compensation for the furnishing, hauling, and placing of all materials, saw cutting pavement to the required depth, the removal and disposal of old concrete, preparing of sublayer, furnishing and installing steel dowels, furnishing and installing reinforcing steel as specified, furnishing, placing, finishing, and curing the concrete, cleaning and sealing joints, patch area protection, and for all other materials, labor, tools, equipment, and incidentals necessary to complete the item.

506.10 - PAY ITEM:

ITEM	DESCRIPTION	UNIT
506001-*	CONCRETE PAVEMENT REPAIR, "Type"	SQUARE YARD (METER)
506002-*	REMOVE AND REPLACE EXISTING AGGREGATE BASE COURSE	CUBIC YARD (METER)

*Sequence number

**Type shall be either Type I or Type II repairs as described in the provision.