

## 602.08

~~adjoining pavement, and bars shall be installed with an approved adhesive anchor system listed on QPL 32 or 52 as directed and shown on the plans. The free end of the dowel bar shall be lightly oiled or greased.~~

~~Approved wood or metal forms shall be placed for side forms adjacent to shoulders. A maximum 12 inches (300 mm) width of shoulder surfacing and base may be removed to facilitate forming; however, the contractor shall repair any damage to shoulder underdrain systems, and patch removed shoulder areas to the satisfaction of the engineer after form removal at no direct pay.~~

~~Concrete for pavement patching shall be Type E complying with Section 901. An approved set accelerating admixture complying with Subsection 1011.02 may be used in the concrete mix at the dosage recommended by the admixture manufacturer for accelerated curing time. The set accelerator shall be added at the jobsite. The concrete shall be placed, consolidated, finished and cured as directed.~~

~~The patched surface shall conform to the existing surface and be textured to match the texture of adjoining pavement. If pavement is to be overlaid, the patch surface shall be drag finished only. The finished patched surface shall meet the surface finish requirements of Subsection 601.11 except an approved minimum 10-foot (3.0 m) metal static straightedge shall be used.~~

~~Patches shall remain closed to traffic a minimum of 72 hours or until standard test specimens conforming to Subsection 601.07 have attained a compressive strength of 3000 psi (20.7 MPa) when tested in accordance with DOTD TR 230.~~

~~Transverse joints shall be formed or sawed, then sealed with a sealant complying with Subsection 1005.02(a) in accordance with plan details and manufacturer's recommendations. Backer material shall be of the size shown on the plans complying with Subsection 1005.02(a).~~

~~In areas where a bond breaker is required in longitudinal joints, the bond breaker shall be a 6-mil (150  $\mu$ m) (nominal) polyethylene sheet or approved equal. The bond breaker shall be placed the full thickness of the slab.~~

~~If patches are opened to traffic and reclosed for joint sawing and sealing, the patches shall remain closed to traffic until, in the engineer's opinion, the sealants have satisfactorily cured to tack free.~~

**602.09 PARTIAL DEPTH PATCHING OF JOINTED CONCRETE PAVEMENT.** This work consists of partial depth patching of concrete pavement in accordance with plan details and the following requirements.

**(a) Patch Preparation:** Saw cuts shall be made with a concrete saw along the perimeter of the pavement to be removed as marked by the engineer.

The saw cut shall be made to the depth of unsound concrete, as determined by the engineer, but shall not be less than 1 1/2 inches (40 mm) nor more than 4 inches (100 mm). If the depth of unsound concrete exceeds 4 inches (100 mm), a full-depth patch shall be placed and payment made under that pay item. Unsound concrete within the patch area shall be removed with approved pneumatic tools having a maximum weight (mass) of 30 pounds (14 kg).

Before placing repair material, transverse and longitudinal joints within or adjacent to patch areas shall be sawed to within 1/2 inch (13 mm) of load transfer or tie steel, and fiberboard or other approved material shall be placed in the joint. The fiberboard, or other approved material, shall be placed to the bottom of the saw cut.

Concrete surfaces within the patch area shall be cleaned of loose particles, oil, dust, traces of asphaltic concrete, joint material and other contaminants by sandblasting before patching. All sandblasting residue shall be removed prior to placement of the patching material.

**(b) Patching Material:** The contractor has the option of using either portland cement concrete or epoxy mortar for partial depth patching of concrete pavement.

**(1) Portland Cement Concrete:** Portland cement concrete for pavement patching shall be Type E complying with Section 901, except that a Grade F aggregate shall be used. An approved non-chloride type set-accelerating admixture complying with Subsection 1011.02 may be used in the concrete mix at the dosage recommended by the admixture manufacturer for maximum strength. The set accelerator shall be added at the job site.

Steel fibers complying with ASTM A-820, Type I or II shall be added to the mix. The nominal length of the fibers shall not be less than 1 inch (25 mm) nor greater than 1 1/2 inches (40 mm). The fiber shall be deformed and shall have an aspect ratio not less than 40 or greater than 60. The concrete shall contain 85 to 90 pounds per cubic yard (51 to 54 kg/cu m) of steel fibers. The fibers shall remain packaged until such time as they are included in the mix. Fibers with a nominal length greater than 1 inch (25 mm) shall be bonded together with water soluble glue. Fibers with a nominal length of 1 inch (25 mm) are not required to be bonded together. Glued fibers shall be the last material added to the mix and they shall be added at a rate not exceeding 132 lbs (60 kg) of fibers per minute. Additional mixing at the manufacturer's recommended mixing speed for at least 1 minute is required after addition of the fibers. Mixer capacity prior to the addition of the fibers shall not exceed 80 percent. Non-bonded fibers shall be blended with the aggregate in such a manner to prevent clumping of the fibers prior to addition of cement and water. Tightly bound or clumped steel fibers shall be broken up or prevented

## 602.09

from entering the mix. The fibers may be screened prior to placing onto the aggregate conveyor belt.

**(2) Epoxy Mortar:** The patching material shall be an epoxy mortar consisting of a mixture of epoxy resin system and thoroughly dry fine aggregate. The epoxy resin system shall be Type I Grade B complying with Section 1017. The epoxy resin system shall be light gray in color. The epoxy components shall be mixed in strict compliance with the manufacturer's mixing recommendations before the fine aggregate is added to the mixture. Epoxy mortar that has begun to generate appreciable heat shall be discarded. The fine aggregate shall consist of a packaged blasting sand. The sand, prior to mixing, shall be in an oven dry condition. The mixture proportions of the epoxy mortar shall be one part epoxy resin system to approximately three parts blasting sand, by dry volume. The final mix proportions shall be such that during placement the slump of the mixture will allow the material to fill all voids and be consolidated and finished. The dry aggregate shall be stored and proportioned so as to yield a uniformly combined material. The epoxy resin system and blasting sand shall be mixed in equipment and by methods that produce a homogenous mixture.

### **(c) Construction Requirements:**

**(1) Portland Cement Concrete:** Concrete surfaces within the patch area shall be cleaned of loose particles, dust and debris, and a bonding grout shall be applied to the existing concrete in the patch area with a stiff bristle brush just before placement of the new concrete. Grout shall consist of equal parts of portland cement and sand by weight (mass) with enough water to provide a stiff slurry. Grout shall be continuously agitated, and shall be used within 90 minutes.

The concrete shall be placed, consolidated, finished and wet cured as directed.

The patch surface shall conform to the existing surface and be textured to match the texture of adjoining pavement. The finished patch surface shall meet the surface finish requirements of Subsection 601.11 except an approved 10-foot (3.0 m) metal static straightedge shall be used.

After the concrete has been placed, consolidated, and cured, transverse joints shall be sawed and sealed as shown on the plans with a sealant complying with Subsection 1005.02(a) in accordance with the manufacturer's recommendations. The longitudinal joint shall be reestablished to match the existing longitudinal joint. Backer material shall be of the size shown on the plans and shall comply with Subsection 1005.02(a). If patches are opened to traffic and re-closed for joint sawing and sealing, the patches shall remain closed to traffic until, in the engineer's opinion, the sealants have satisfactorily

cured to tack free.

Patches shall remain closed to traffic until standard test specimens conforming to Subsection 601.07 have attained a compressive strength of 3200 psi (22.0 MPa) when tested in accordance with DOTD TR 230.

**(2) Epoxy Mortar:** The surface of the repair areas shall be heavily primed with neat blended epoxy immediately before the epoxy mortar is placed. Priming shall include overlapping the surface of the area adjacent to the patch. The mixture shall be placed and tamped with sufficient effort to eliminate voids and to thoroughly compact the product. All patches shall be finished to the cross section of the existing pavement.

After the epoxy mortar has been placed, any transverse joints shall be sawed and sealed as shown on the plans with a sealant complying with Subsection 1005.02(a) in accordance with manufacturer's recommendations. Any longitudinal joint shall be reestablished to match the existing longitudinal joint. Backer material shall comply with Subsection 1005.02(a).

The patch surface shall conform to the existing surface and be textured to match the texture of adjoining pavement. The finished patch surface shall meet the surface finish requirements of Subsection 601.11 except an approved 10-foot (3.0 m) metal static straightedge shall be used.

Patches shall remain closed to traffic for at least 2 hours at air temperatures of over 60°F (16°C), and at least 4 hours at lower air temperatures unless otherwise approved by the engineer. If patches are opened to traffic and re-closed for joint sawing and sealing, the patches shall remain closed to traffic until, in the engineer's opinion, the sealants have satisfactorily cured to tack free.

## ~~602.10 PATCHING CONTINUOUSLY REINFORCED CONCRETE PAVEMENT.~~

~~This work consists of removing and replacing continuously reinforced portland cement concrete pavement at locations shown on the plans or as directed, in accordance with plan details and the following requirements.~~

~~Patching operations shall be conducted in one lane at a time. Patching operations shall not be performed in the adjacent lane until the previously patched lane has been reopened to traffic. Patches shall remain closed to traffic a minimum of 72 hours or until standard test specimens conforming to Subsection 601.07 have attained a compressive strength of 3,000 psi (20.7 MPa) when tested in accordance with DOTD TR 230.~~

~~When possible, pavement removal and replacement shall be completed during daylight hours. If pavement has been removed and cannot be replaced during daylight hours the patch area shall be temporarily backfilled with satisfactory aggregate and shall remain closed to traffic until the patch is~~