

**833 - PAVEMENT PATCHING**

**SECTION 833**

**PAVEMENT PATCHING**

**833.1 DESCRIPTION**

Patch the existing pavement as shown in the Contract Documents or at locations directed by the Engineer.

**BID ITEMS**

- Asphalt Pavement Patching
- PCCP Patching (\*) (\*\*)
- PCCP Edge Joint Patching (\*\*\*)
- PCCP Joint Patching (Full Depth)
- PCCP Joint and Crack Patching (\*\*\*)
- Extra Work Saw Cuts (Set Price)
- \*Thickness
- \*\*Sound or Unsound
- \*\*\*Partial Depth or Full Depth

**UNITS**

- Ton
- Square Yard
- Square Yard
- Square Yard
- Square Yard
- Linear Foot

**833.2 MATERIALS**

Provide materials that comply with the applicable requirements.

- HMA-Commercial Grade ..... **SECTION 611**
- Emulsified Asphalt (SS-1H and CSS-1H) ..... **DIVISION 1200**
- Concrete (AE) (See **TABLE 833-1**) ..... **DIVISION 400**
- Concrete Curing Materials ..... **DIVISION 1400**
- Hot Type Joint Sealing Compound ..... **DIVISION 1500**
- Reinforcing Steel ..... **DIVISION 1600**

<b>TABLE 833-1: ADDITIONAL REQUIREMENTS FOR PAVEMENT PATCHING AIR-ENTRAINED CONCRETE</b>	
<b>Component</b>	<b>Requirement</b>
Aggregate:	Use any concrete pavement aggregate that complies with <b>subsection 1102</b> . Crushed limestone or dolomite for use in unsound pavement patching need not comply with the requirements for durable Class I or Class II aggregates.
Cement:	<ul style="list-style-type: none"> <li>• For concrete with a minimum cure of 24 hours, use a minimum of 750 lbs./cu. yd. of either Type I or Type II cement that complies with <b>DIVISION 2000</b>.</li> <li>• For concrete with an accelerated cure*, use a minimum of 658 lbs./cu. yd. of Type III cement that complies with <b>DIVISION 2000</b>.</li> </ul>
Calcium Chloride:	<p>For concrete with an accelerated cure*, use Grade 2 calcium chloride that complies with <b>DIVISION 1700</b>. Add the calcium chloride by solution (the solution is considered part of the mixing water).</p> <ul style="list-style-type: none"> <li>• For a minimum cure of 4 hours at 60°F or above, use 2% (by dry weight of cement) calcium chloride.</li> <li>• For a minimum cure of 6 hours at 60°F or above, use 1% (by dry weight of cement) calcium chloride.</li> </ul>
Slump:	The maximum slump at the time of placement is 2½ inches.

\*For concrete with an accelerated cure, the Contractor has the option to use a rapid-set concrete patching material that complies with **DIVISION 1700**.

Provide either a cementitious grout or an epoxy-resin-base bonding system (Type IV, Grade 3, Class B/C) to grout new reinforcing steel into existing concrete pavement. Provide material that complies with **DIVISION 1700**.

## 833 - PAVEMENT PATCHING

Provide concrete grout that complies with **DIVISION 400**. The Engineer will accept the grout based on visual inspection for compliance with specified requirements.

### 833.3 CONSTRUCTION REQUIREMENTS

**a. General.** Prepare the areas for patching according to the Contract Documents. Unless otherwise provided in the Contract Documents, restrict the pavement patching operations to 1 traffic lane at all times.

Schedule the patching operations so that the areas prepared for patching are patched the same day the deteriorated pavement is removed. If unavoidable delays prevent patching the same day, fill the excavated areas with a compacted (temporary) asphalt mixture before nightfall.

If shown in the Contract Documents, delineate the limits of the patch by sawing the existing pavement to the depth indicated before removing the deteriorated pavement. Use a saw that will produce a smooth cut for the required depth. Coordinate the pavement sawing and patching operations so that the sawed areas are patched within 3 working days.

Prepare the areas for patching by removing the deteriorated pavement to the limits designated in the Contract Documents. If the removal of the deteriorated pavement to the designated limits reveals further deterioration in the existing pavement, extend the limits of the patch to include the exposed deficient pavement, as directed by the Engineer.

When removing the deteriorated pavement, do not damage the remaining pavement. Do not disturb the subgrade while preparing the areas for patching, except to accommodate the thickness of pavement patching shown in the Contract Documents. Adjust and re-compact the subgrade to the required lines and grades.

Remove all waste materials the same day they are excavated.

**b. Asphalt Pavement Patching.** After the deteriorated pavement is removed, clean the exposed edges of the existing pavement. Before placing the HMA patch, apply a thin tack coat of emulsified asphalt to the clean edges of the existing pavement.

Place the HMA in uniform layers of 3 inches or less in thickness. Compact each layer until no further consolidation is observed. Clean the surface of the preceding layer of compacted HMA before the succeeding layer of asphalt material is placed.

**c. Concrete Pavement Patching.** Reference the location of the existing joints in the concrete pavement before removing the deteriorated pavement. During the patching operations, establish new joints at the same locations as the original joints.

(1) Full Depth Patches. Saw the limits of full depth patches the full depth of the existing concrete pavement. If the existing concrete pavement will receive an overlay the same construction season, a rock saw is allowed for the sawing.

Make full depth patches the full lane width wide and a minimum of 6 feet longitudinally.

(2) Partial Depth Patches. The minimum patch size for partial depth patches is 4 inches by 10 inches. Delineate the limits of partial depth patches a minimum of 2 inches beyond the area of deteriorated pavement. If areas defined for partial depth patches are less than 12 inches apart, include the areas into a single patch.

Saw the limits of partial depth patches to a depth of 2 inches.

Use jackhammers (15 pounds maximum size) to remove the deteriorated pavement to the depth shown in the Contract Documents. Cut out or chip away the connecting edges below the sawed portion to as near true lines with vertical faces as possible. The Engineer may approve self-propelled milling machines on a performance basis.

After the deteriorated pavement is removed to the saw or mill depth, use a steel-faced hammer or steel chain drag to check for unsound concrete below this depth. If unsound concrete is detected, use jackhammers (15 pounds maximum size) to remove the deteriorated pavement below the saw or mill depth.

If the unsound concrete encountered is more than 4 inches deep and constitutes more than 50% of the surface area of the patch, the Engineer will determine if the patch should be a full depth patch.

If the pavement patch is started according to the details for Joint and Crack Patching (Partial Depth) and the Engineer changes the patch to a full depth patch, construct the full depth patch according to the details for Full Joint and Crack Patching. See Concrete Pavement Joint and Crack Patching standard details.

If the pavement patch is started according to the details for Edge Joint Patching (Partial Depth) and the Engineer changes the patch to a full depth patch, construct the full depth patch according to the details for Full Edge Joint Patching. See Concrete Pavement Edge Joint standard details.

## 833 - PAVEMENT PATCHING

Clean the partial depth patches using compressed air or a stiff rotary broom. Sandblast the cavities of the partial depth patches to expose aggregate and mortar.

Before concrete is placed in the partial depth patch, apply concrete mortar to the prepared surfaces of the patch. If the mortar dries before the concrete is placed, remove the dried mortar by sandblasting and re-apply fresh mortar.

(3) All Patches. If required, drill holes and grout the specified steel reinforcement into the existing concrete pavement according to **SECTION 842**.

Place and consolidate the specified concrete in the areas prepared for patching, strike-off the concrete flush with surface of the existing pavement, and finish the surface with a wooden float or another method approved by the Engineer.

Either form (using joint forming backer board) or saw transverse and longitudinal joints a minimum of ¼ inch wide and ⅝ inch deep. After removing the backer board from formed joints or flushing sawed joints with water, sand blast the vertical faces of the joint. Clean the sand blasted joints with compressed air and seal the joints according to the Contract Documents.

Do not place concrete patches if the ambient air temperature is below 40°F. If the ambient air temperature is below 60°F when the concrete patches are placed, the Engineer may require additional curing time. If the ambient air temperature is above 90°F when the concrete patch is placed, apply the curing materials before the undue loss of moisture occurs.

Unless directed otherwise by the Engineer, cure the concrete patches by applying liquid membrane-forming compound at the rate of 1 gallon per 150 square feet to the finished patch. If the existing concrete pavement will be overlaid with HMA in the near future, the Engineer may require that concrete patches are cured with emulsified asphalt.

### 833.4 MEASUREMENT AND PAYMENT

The Engineer will measure asphalt pavement patching by the ton of HMA used.

The Engineer will measure the various types of concrete pavement patching by the square yard.

Removal of the existing pavement for either asphalt or concrete pavement will not be measured for separate payment.

If the Contractor chooses to use a milling machine to remove the deteriorated pavement, and the area removed is greater than the area originally defined for the partial depth patch, the Engineer will base the measurements of the partial depth patch on the dimensions originally defined for the patch.

The Engineer will measure a patch started as partial depth patch, but completed as a full depth patch, as a full depth patch.

A patch started according to the details for Joint and Crack Patching (Partial Depth) and completed as a full depth patch is measured and paid as Joint and Crack Patching (Full Depth).

A patch started according to the details for Edge Joint Patching (Partial Depth) and completed as a full depth patch is measured and paid as Joint and Crack Patching (Full Depth).

Patches started according to Partial Depth, but completed as Full Depth due to Contractor's negligence will be measured as Partial Depth patches.

If additional saw cuts are required to expand a patch, or to change a partial depth patch to a full depth patch, the Engineer will measure the additional saw cuts by the foot.

Payment for "Asphalt Pavement Patching", "PCCP Patching", "PCCP Edge Joint Patching", "PCCP Joint Patching (Full Depth)" and "PCCP Joint and Crack Patching" at the contract unit prices and "Extra Work Saw Cuts (Set Price)" at the contract unit set price is full compensation for the specified work.