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Section 304. RUBBLIZING PORTLAND CEMENT CONCRETE PAVEMENT

304.01. Description. This work consists of preparing, shattering, compacting reinforced or non-reinforced Portland Cement Concrete (PCC) pavement to provide a rubblized base, and disposing of excess and deleterious material in accordance with subsection 205.03.P.

304.02. Materials. Provide material in accordance with the following:

Dense-Graded Aggregate 21AA 902

304.03. Construction.

A. **Equipment.** Use an Engineer-approved water system to suppress dust generated from pavement shattering operations.

For rubblizing pavement, use one of the following types of self-contained, self-propelled pavement breaking equipment:

1. Resonant frequency equipment producing a low amplitude breaking force; or
2. Multiple impact hammer equipment, capable of lifting and falling in an independent, adjustable, random sequence with variable force of impact.

If using impact hammer equipment, the number and spacing of hammers may vary. Ensure the weights of individual hammers do not destroy the integrity of layers within 24 inches below the rubblized pavement.

B. **Preparation Work.** Before beginning pavement rubblizing, complete all of the following:

1. Saw cut a relief joint full depth where rubblizing abuts concrete pavement required to remain or will be rubblized in a later stage.
2. Match the elevation of pavement widening or shoulders to the adjacent pavement requiring rubblizing.
3. Complete construction of drainage systems for the new pavement structures, including outlet endings. Backfill and compact to the existing grade to prevent damage to the drainage system.
4. Remove pavement shown on the plans or directed by the Engineer, over utilities or pipes with less than 18 inches of granular material cover, as measured from the bottom of the pavement to the top of the utility or pipe. Extend the limits for pavement removal 3 feet beyond each side of utility or pipe. Backfill the removal area with filler aggregate, in layers no greater than 6 inches, and compact.
5. Remove loose patching material before rubblizing, as directed by the Engineer. Do not fill voids before rubblizing.

C. **Quality Control Checks.** Perform all of the following field checks and provide same day documentation of field checks to the Engineer:

1. At the start and during rubblizing operations, establish, demonstrate, and document equipment capabilities, including the speed and impact frequency.
2. At least once per lane, and every 1,500 feet, inspect the rubblized pavement to determine if the rubblizing operation has de-bonded the reinforcement from the concrete and is achieving the particle size specified in subsection 304.03.F.

Mechanically excavate an area of 25 square feet through the full depth of the pavement, taking care not to further rubblize. Location of the check will be determined by the Engineer. Notify the Engineer at least 2 hours before excavation to allow verification of results for acceptance.

If the Engineer directs, perform spot inspections to the top of reinforcement, using manual methods. Considerable physical effort must be expended to inspect rubblized material by manual excavation. Use a shovel or pick to excavate an area of 25 square feet. Use a geologist pick or mason hammer to separate the concrete pieces above the reinforcing mat. Remove as much material as possible and clean the remaining surface with a stiff-bristled broom or brush to expose the reinforcing mat. The Department considers the mat de-bonded if at least 80 percent of the mat is visible after excavation and sweeping.

If performing inspection using manual methods, sound concrete below the reinforcing mat to determine if material is fractured.

Restore inspection sites with filler aggregate and compact. The Engineer may adjust the inspection frequency.

3. Ensure the completed rubblized surface has a uniform appearance with no unbroken strips of pavement, exposed reinforcement, or visible joint filler and Hot Mix Asphalt (HMA) patching material.

D. **Compaction.** Before placing the HMA mixture, compact the rubblized pavement with vibratory steel-wheeled and pneumatic-tired rollers in the following sequence:

1. At least two passes with a Z-grid vibratory roller, or steel drum roller, as approved by the Engineer;
2. A third pass, and subsequent passes, with a pneumatic-tired roller; and
3. A final pass just before HMA placement with a pneumatic-tired roller.

The Department considers a pass, down and back in the same path.

Provide rollers with a nominal gross weight of at least 10 ton. Operate vibratory rollers in a high vibration mode and at a speed no greater than 6 feet per second, unless otherwise limited by the condition of the base, subbase, subgrade, or drainage features.

The Contractor may apply water if the Engineer approves. Avoid rehydrating cementitious materials.

After compaction and before placing HMA, ensure the finished surface varies no more than ± 1 inch, when tested with a 10-foot straightedge. Fill voids and depressions with filler aggregate and compact.

E. Miscellaneous. Do not allow vehicular traffic on the rubblized pavement before HMA placement, unless otherwise required for construction and maintenance of traffic, as approved by the Engineer. Maintain the compaction of portions of the rubblized pavement, with no exposed reinforcement, for crossroad or ramp traffic.

In part-width construction areas, rubblize the pavement to the limits of the required overlay for that stage. Saw cut the longitudinal joint deep enough to cut the tie bar, unless rubblizing extends beyond the centerline and past the tie bar.

Avoid damaging items required to remain, including drainage structures and monument boxes.

F. Acceptance Criteria. The Engineer will observe quality control checks described in subsection 304.03.C and base acceptance on the following criteria:

1. PCC pavement shattered to full-depth;
2. Non-reinforced PCC pavement and concrete pavement patches reduced to unbound particles with a nominal diameter less than 10 inches;
3. Reinforced PCC pavement and concrete pavement patches, above the reinforcement, reduced to unbound particles with a nominal diameter from 2 inches to 6 inches;
4. Reinforced PCC pavement and concrete pavement patches, below reinforcement, exhibit sporadic particles greater than 10 inches, provided the Engineer verifies de-bonding of reinforcement near the particle;
5. No oversized particles at the surface for PCC pavements;
6. De-bonding of reinforced pavement achieved, if the required particle size is met;

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7. Exposed reinforcement has been cut off below the surface and removed. Embedded reinforcement may remain in place;
8. No visible joint sealant or HMA patching material on the compacted surface and voids filled with filler aggregate;
9. Joints, and cracks greater than ¼ inch wide at the surface not distinguishable; and
10. No displacement of underlying base, subgrade, or underdrains.

304.04. Measurement and Payment.

Pay Item	Pay Unit
Pavt, Rubblize	Square Yard
Aggregate, Filler	Ton
Saw Cut, Rubblize	Foot

A. **Rubblized Pavement.** The unit price for **Pavt, Rubblize** includes the cost of the following:

1. Required quality control work;
2. Rubblizing;
3. Dust suppression, including water;
4. Removing joint fillers and patching material;
5. Cutting exposed steel, loading, hauling, and disposing of the steel and immediate restoration of disturbed rubblized concrete;
6. Breaking down or removing and disposing of oversized pavement pieces;
7. Disposing of material removed from inspection areas; and
8. Maintaining the condition of the rubblized pavement until placement of the HMA pavement.

B. **Filler Aggregate.** The unit price for **Aggregate, Filler** includes the cost of producing, delivering, placing, leveling, and compacting the aggregate in rubblized pavement.

C. **Saw Cut, Rubblize.** The unit price for **Saw Cut, Rubblize** includes the cost of cutting a relief joint full depth where the rubblizing abuts concrete pavement, required to remain, or removed for other purposes, and cutting the longitudinal joint where necessary.

The Department will pay for concrete pavement removal separately as **Pavt, Rem**, in accordance with section 204.