INDEX FOR
SPECIFICATIONS FOR RUBBLIZATION OF PORTLAND CEMENT CONCRETE PAVEMENTS

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885. 1 SCOPE

These specifications govern all operations necessary for and pertaining to the rubblization of Portland Cement Concrete Pavements.

885. 3 MATERIALS

3.1 Crushed Rock, 50mm Minus

If Crushed Rock, 50mm Minus is required, it shall meet the following requirements:

- Maximum Los Angeles abrasion loss of 35% (ASTM C131).
- The gradation of the Crushed Rock, 50mm Minus shall be as follows:

Canadian Metric Sieve Size	Percent of Total Dry Weight Passing Each Sieve
50mm	100%
4.75mm	25 – 85%
0.075mm	5 – 18%

The method of producing the material shall be such that none of the material shall exceed 50mm in any plane. Should the material produced be of an improper size, poorly graded or unsatisfactory for any other reason, the Engineer may require adjustments or changes to the processing plant or source of supply.

885. 5 EQUIPMENT

5.1 Breaker

The equipment shall be specifically designed to rubblize existing plain or reinforced Portland cement concrete pavements, and shall be a self-contained, self-propelled multi-head breaker or a resonant breaker.

If the equipment is a multi-head breaker, the hammer heads shall be mounted laterally in pairs with half the hammers in a forward row, and the remainder diagonally offset in a rear row so there is continuous pavement breaking from side to side. Hammer drop height shall have the ability to be independently controlled. This equipment shall have the capability of rubblizing concrete pavement up to 3.7 metres in width, in a single pass.

If a self-contained, self-propelled resonant breaker is used, it shall produce low amplitude, high frequency blows by vibrating a large steel beam that is connected to a foot (can be varied in width from six to twelve inches) that is moved along the concrete surface at the front of the machine. Multiple passes will be required to rubblize the full lane width.

5.2 Rollers

A Z-pattern steel grid roller shall consist of a self-contained self-propelled vibratory steel wheel roller with a Z-pattern grid cladding bolted transversely to the surface of the drum. The vibratory roller shall have a minimum gross weight of 9 tonnes.

A vibratory steel smooth drum roller shall consist of a self-contained self-propelled vibratory steel wheel roller with a smooth surface.

5.3 Inspection of Equipment

Equipment required for this work shall be in satisfactory working condition and so maintained for the duration of the work.

Equipment shall be on the site and available for inspection, testing and approval before operations commence.

885. 7 CONSTRUCTION METHODS

7.1 Pre-Rubblizing Preparation

Bituminous overlays shall be removed prior to the start of rubblizing operations. Other preparation activities may be required in advance of rubblizing operations. Areas which require preparation prior to rubblizing concrete pavement will be designated by the Engineer or detailed in the Special Provisions.

Payment for pre-rubblizing preparation will be paid for at the appropriate unit prices as set forth in the Contract.

7.2 Rubblization

The Contractor shall rubblize the existing concrete pavement, such that the upper half of the pavement shall be broken with at least 75 percent of the pieces are a maximum of 75mm in diameter. The lower half of the pavement shall be broken such that at least 75 percent of the pieces shall be a maximum of 225mm in diameter. Concrete to steel bond shall be broken.

Any large concrete pieces that result from inadequate breaking shall be treated as follows:

Greater than 225mm At surface of broken pavement	Reduce size to under 225mm, or remove and replace.
Greater than 300mm Below lower half of pavement	Reduce size to under 300mm, or remove and replace.

The Contractor shall be responsible for either reducing inadequate broken pavement or for removal and replacement with Crushed Rock, 50mm Minus.

The Department reserves the right to modify the above specified gradation at any time during construction.

7.3 Z- Pattern Steel Grid

A Z-pattern steel grid roller shall be used to further break and consolidate the rubblized material. The vibratory roller shall make a minimum of 6 passes to consolidate the material.

7.4 Steel Smooth Drum

A vibratory steel smooth drum roller shall follow the vibratory Z-pattern grid roller to smooth the rubblized concrete surface. Re-compaction may be required where removal of deleterious items has occurred with the vibratory steel smooth drum roller.

7.5 Adverse Weather Conditions

If precipitation occurs between rubblizing and construction of the overlying material specified in the Special Provisions, the rubblized pavement shall be dry and stable to the satisfaction of the Engineer before the construction of the overlying material commences.

7.6 Deleterious Items

Reinforcement steel shall be left in place, except that any reinforcement projecting from the surface after rubblizing or compaction shall be cut off below the surface and removed. Any loose joint filler, expansion material, or other similar items shall also be removed.

The Contractor shall re-compact all areas where removal of deleterious items has occurred using the vibratory steel smooth drum roller in order to reseat any loose concrete rubble.

The removed material shall become the property of the Contractor and shall be disposed of outside of the right-of-way limits.

If any materials are required to backfill areas of excavated deleterious items, the required materials will be paid for at the applicable unit prices.

7.7 Protection of Underground Utilities and Drainage Structures

The Contractor shall prevent damage to underground utilities and drainage structures during rubblization.

Concrete panels overlying concrete drainage structures, fibre optic cables and gas lines will be removed and the excavation backfilled with Crushed Rock, 50 mm Minus (Limestone).

Approved alternate breaking methods shall be used over underground utilities and drainage structures, as specified on the Plans or directed by the Engineer.

7.8 Approvals

Prior to the acceptance of the proposed breaking procedure, the Contractor shall complete a strip for evaluation by the Engineer. To ensure the pavement is being broken to the specified dimensions; the Contractor shall excavate a broken area of 1 square meter, in two separate locations during the first day of breaking, as directed by the Engineer. Modifications to the breaking procedure must be made if the size requirements are not met. These excavations may be repaired with Crushed Rock, 50mm Minus.

Additional excavations to inspect the broken pavement dimensions shall be made on a daily basis, as directed by the Engineer.

7.9 Coverage of Rubblized Areas

If Granular Base Course is the proposed overlying material, the construction of the Granular Base Course, shall begin within 24 hours of the rubblization operation.

The Specifications for “Granular Base Course” shall govern for supply of material, placement, equipment and all operations necessary for and pertaining to the construction of a granular base course.

If “Bituminous Pavement or Recycled Bituminous Pavement” is the proposed overlying material, the Contractor shall ensure that the rubblized concrete surface is sufficiently compacted so as to prevent damage to the overlying bituminous pavement.

Cracked or fatigued areas detected in the overlying bituminous material on any lift shall be saw-cut and removed at the expense of the Contractor. The material removed from the saw-cut area shall become the property of the Contractor to be disposed of outside of the right-of-way and the resulting excavated area shall be patched with Bituminous Pavements.

The Specifications for "Bituminous Pavement and Recycled Bituminous Pavement" shall govern for supply of material, placement, equipment and all operations necessary for and pertaining to the construction of a Bituminous Pavement and Recycled Bituminous Pavement.

885. 8 METHOD OF MEASUREMENT

Rubblizing will be measured for payment in square meters of existing pavement in place.

885. 9 BASIS OF PAYMENT

9.1 Rubblize Concrete Pavement

The unit price for "Rubblize Concrete Pavement" will be considered as payment in full for rubblizing, saw-cutting steel, removal and disposal of any reinforcing steel, removal of deleterious material, re-compaction of repaired areas, grid rolling and smooth rolling the rubblized concrete pavement, saw-cutting and removal of cracked/fatigued bituminous material due to poorly seated rubblized concrete and for all work necessary or incidental thereto.