

SECTION 126- STRUCTURAL REPAIRS

Minor Repairs

2715. Soil surfaces- Regular blading or dragging is necessary on earth, gravel, or stabilized surfaces, to remove ruts, potholes, depressions, and corrugation. Work is best done during or soon after rain. In dry weather a roller or scarifier may be needed to bring up and blend in moist material. To retain camber, start work at the road edge, moving the soil by successive passes towards the crown.

2716. Water bound surfaces.

a. Potholes. Potholes must be repaired at once. Cut the hole square remove loose material. Mud, and water refill with graded stone or gravel, rammed in 3-in layers and bind the top layer screenings, well watered and rolled. Deep holes should be to the solid subgrade. Potholes in dry dirt roads are best repaired with aggregate. Calcium chloride can be used to retain moisture, and to improve compaction and bonding with the original surface.

b. Raveling. Raveling can be cured only by scarifying, rebinding and compacting.

c. Dust. Dust interferes with traffic, and means the loss of revenue is a palliative, but oiling chemical treatment. Or surface dressings are better methods of control.

d. Surface dressing with a bituminous binder and chippings is the most effective means of maintenance as it increases traffic capacity as well as preserving the surface.

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TABLE 27.1 : DUST CONTROL USING OILS AND BITUMINOUS MATERIALS

Serial	Material	Method of application	Quantities	Results and limitations
(a)	(b)	(c)	(d)	(e)
1	Heavy fuel oils	Three to five applications	from 1.25 to 4.25 litres per m ²	Produces good results on well-graded soils. Tends to make surface slippery under light rainfall.
2	Light oils	apply dressing every 2 to 4 weeks and as soil dries out after heavy rain.	1.2 litres per m ²	Produces good results on well-graded soils. Tends to make surface slippery under light rainfall.
3	Cut-back bitumen	distribute evenly and allow to penetrate	3.25 litres per m ²	Gives satisfactory results on soils of suitable type but some humidity is desirable
4	Bitumen emulsion	a. Granular soils. spray the surface with one or two applications of emulsion.	1.5 litres per m ²	In both cases as surface skin of bitumen is formed. gives good results under pre-fabricated metals surfacing.
		b. Clay and Cohesive Soils. sprinkle surface with water (2 applications at 2.5 litres per m ²)	1.5 litres per m ²	Note: In method b, labile and semi-stable grades of emulsions cannot be used, as they cannot

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		and allow to penetrate. then dilute one part of table emulsion with two parts of water and spray surface with mixture (four or five applications, lightly scarifying or dragging after each application).		be diluted with water without cuagulation or braking.
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2716. Bituminous surfaces: -

- a. Potholes must be repaired immediately, as in para 736 (a) , but the top edges must be cut vertical or be slightly undercut the surface is made good with well compacted bituminous material, often cold-laid, of using the mobile patching plant.
- b. Crazeing and smoothing are corrected by surface dressing.
- c. Raveling and corrugation are best repaired by the retreading process (see para 740)
- d. Bleeding in hot weather is dealt with by blinding with chippings or coarse sand .
- e. Emergency repairs can be done with granular soil gravel, or hard rubble thoroughly compacted and constantly made up, but should be replaced by orthodox bituminous patching as soon as possible.

2717. Concrete pavements. The aim is to keep the subgrade dry, and to maintain a smooth surface. Maintenance is confined to care of joints, filling cracks, replacing broken portions of the slab, and renovation of crumbling surfaces: -

- a. Joints and cracks are sealed with sealing compound (see para 559)
- b. Broken portions of the slab need only be replaced when they are displaced, or are too small to distribute the load without rocking. The damaged portion should be cut to rectangular shape, the sides being trimmed with the top 2 ins vertical and the lower portion at about 45 the latte being left rough, but quite free from fragments, dirt or dust. Methods of patching are:

- (1) Concrete of the as ne type as the original laid as dry as possible, clean and moisten as dry as possible. Clean and neat cement grout. Place the new material, tamping and ramming thoroughly – leaving it about $\frac{1}{4}$ in proud of the old surface. Re-tamp an hour later true up with a straight – edge and finish. New work must be crude before traffic passes over it.

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(2) Cement bound macadam patches can be opened to traffic temporally before the grout is applied. Prepare the hole as for concerned patching fill with stone, gravel or broken concrete about 1 .5 to 2.5 ins (in size) and compact thoroughly. Spread over the patch a thick grout of 1 part cement to 2 or 2.5 parts sand, and force into the voids by tamping or booming. Curing and finishing are the same as for a concrete patch.

(3) Bituminous patches are satisfactory provided that they are supported by a base of strength equivalent to that of the concrete slab. Bituminous grouting is recommended (see section 95). Such patches can be opened to traffic in a few hours.

(4) Emergency patching can be done with natural soil, if it is compacted at the proper moisture content, but the patch must be packed and compacted progressively from bottom to top. If the surface of the patch becomes muddy in use it should be made good with fine aggregate.

c. Crumbling Surface. The most satisfactory remedy is a bituminous surfacedressing. Shallow depressions requiring thin-edged patches are best repaired with a bituminous patch using fine aggregate. Small patches, however, are best made by cutting out square to a depth of about 50 mm and making good with dry-mix concrete.

Major Repairs

2718. The normal sequence of task is:-

- a. Clean and improve drainage ditches.
- b. Cut out sunken portion of the base excavating through the formation to dry sound subgrade and make good with hand pocked stone.
- c. Make up depression with broken stone of suitable gauge.
- d. Resurface all renovation work.
- e. Construct a fresh wearing surface or apply bituminous surface dressing.

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2719. Bituminous retreading. Break up the existing road surface to a depth of about 3 ins by scarifying and rolling. Loosen the surface with spike – toothed harrows, complete the filling of potholes etc, and grade to correct camber or crossfall. Spray the loosened surface with stable-grade bitumen emulsion at $\frac{1}{2}$ gallon per sq yd. Make a single pass with the harrow. Spray again at the same rate. Make another pass with the harrow. Make a single pass with the roller. Complete compaction the next day, after the emulsion has broken. The road may then be opened to traffic for about two weeks, after which surface dressing be applied.

2720. Concrete pavements. Major repairs are made necessary by enemy action ,abnormal loading , defective drainage , or inadequate support due to settlement or wash outs. The first essential is to determine the cause of failure, and to prevent a recurrence.

Even settlement of particular slabs can be corrected by laying a bituminous carpet of correct thickness on top, provided that the slab is fully supported.

Small cavities or depression can be filled with cement slurry or a bituminous mixture. Dig an inspection hole in the shoulder, where the Joint or crack strikes the edge of the slab. Drill a hole in the slab with a Jackhammer, in a position depending on the location of the weak spot, but normally about 12 ins from the transverse joint and on the far side of it relative to the direction of traffic flow. Expel mud and water by blowing compressed air through a nozzle into this hole, and force in filling material in the same way. To fill large cavities, or to lift settled portions of the slab. Pump in a slurry of sandy soil and water through 2- in holes in the club. Clay soils must not be used for this purpose.

2721. Repair of craters is dealt with in section 129.