SECTION 79 - CONSTRUCTION PROCEDURE

Sub Grade

1709. Before laying a pavement, ensure that the sub grade is:

a. Adequately drained.
b. Correctly formed to level, and to camber or cross fall.
c. Properly compacted.

Sub-Base

1710. The following must be specified:

a. Type of material.
b. Thickness (normally 3 to 6 inches, depending on nature of sub grade and climatic conditions):
c. Method of drainage.
d. Degree of compaction.

1711. During Construction:

a. Avoid damaging the compacted sub grade by transport or plant.
b. Check that compaction plant achieves adequate compaction without damaging the sub grade.
c. Ensure that the surface is properly finished to level, and to camber or cross fall.

1712. Compaction plant:

a. 2 ½ ton rollers. Normally adequate if traffic can be kept off the sub- bas, or if it does not cause rutting.

b. Heavier rollers (up to 6 tons). Normally required if traffic causes rutting. On new embankments, or if the sub grade contains much clay or loam, also increase the sub-base thickness.

Base Construction

1713. Quantities. In the absence of data, assume that the loose layer should be 25 per cent thicker than the compacted layer, and carry out compaction trials.

Figure 17-5: Compaction Plant.

1714. Organization. Establish balanced teams of plant, transport and labor at each stage (sacs chapter 23) Route traffic to avoid mutual interference.

1715. Hauling, dumping and spreading:

a. Routing. Dumping vehicles run only on the base material, unless incidental compaction is of more benefit to the sub-grade.

b. Dumping: Spreading is simplified by controlled dumping on the formation. Regulate the flow of material by spreader boxes or restricted tailgate openings.

c. Spreading. If a spreader and finisher is not available use a light dozer, spreading when moving forward, and trimming when backing up.

Figure 17-6: Spreader.

Figure 17-7: Finisher.

1716. **Blending and missing**:

a. Deliver materials in correct proportions.

b. Spread evenly with the finer material on top.

c. initial mixing by scarifies or harrows.

d. Final missing by rotary tiller or grad. Graders blade the whole layer alternately to center and edges of the roadway until material is thoroughly mixed.

1717. Compaction. Thorough compaction is Essential. See Table 13.1 and RESPB No. 5D Chapter 5.

1718. Finishing. The base should be finished to a properly shaped and well compacted surface. Special care must be taken to eliminate holes left by sheep foot rollers. Graders are most suitable where graded aggregate has been used. Final rolling of graded material is done with either pneumatic tired or smooth wheel rollers.

Construction Techniques

1719. Concrete and cement bound construction. See Chapter 22.

1720. Stone pitching: In stone pitching, which is sometimes described as soling, a dense layer of relatively large stone is laid by hand directly on the formation, the surface voids being filled with smaller gauge stone. Layers are normally 150 to 300 mm thick. Hand-pitching is a laborious process and it is

normally practicable only for repair work or for short stretches of road on a bad foundation.

a. Material. River boulders or quarried stone with the longer dimension from 6 to 12 ins.

b. Setting out. Fix level pages to form panels about 10 ft square.

c. Laying. Place each stone by hand with the longer side vertical and the smaller end at the top. break off projecting points with a sledge. Fill interstices with spalls or chips.

d. Compaction. Use a heavy roller (10- ton if possible) Start rolling at the edges and work in wards. Make good any depressions with 2 in material. Continue until there is no apparent movement of the stone.

e. Finishing. A separate surface course must be provided but traffic can run directly on pitching and will help in compaction.

f. Construction. The procedure is as follows:

(1) If time and materials permit, a sub-base should be laid to protect the formation .

(2) Arrangements are made to control levels. A suggested method is to lay out the work in panels about 3 m square with level pegs in each corner.

(3) Stones are selected which have their longest dimension between 150 and 300 mm.

(4) The stones are laid with the longest side vertical and the smallest surface at the top. They must be packed tightly together.

(5) Projecting points are knocked off with sledge hammers.

(6) The gaps between the stones are filled with smaller stones which must be tightly wedged in.

(7) If available, a heavy roller should be used for compaction; otherwise compaction may be left to the traffic.

1721. Hardcore:

a. Good quality hardcore is formed of hard building rubble, mainly broken brick or concrete, or of broken limestone or slag. The term hardcore is, however, often used to include materials such as clinker, ashes, and large pebbles or rounded stone. The gauge of hardcore is from 4 inches to dust.
Material. Preferably broken concrete, brick, limestone or slag. For mechanical spreading maximum size should not exceed 4 ins.

b. Laying. Spread (usually by dozer) and compact in Eliminate pockets of fine material.

c. Compaction. Use an 8 ton roller, if available. Start rolling at the edges and work inwards. The compacting effect of traffic is most useful and can be exploited by building the road in two halves and allowing traffic over one half while working on the other.

d. Special uses. Hardcore is invaluable for repair work and can be rolled into holes or depressions in any type of surface.Roads to carry vehicles up to class 9 are most rapidly built, over medium sub grades, or two 4 inches layers of hardcore, spread by dozer and separately watered and compacted.

e. Construction. The sequence of construction is as follows:

(1) The formation is prepared ensuring that there are adequate shoulders to prevent the base spreading during compaction.

(2) Arrangements are made for controlling the levels, eg blocks or correctly levelled pegs on which a template can be used.

(3) The material is broken up to a maximum size of 100 mm and spread in a layer 100 to 150 mm thick, care being taken not to form pockets consisting of fine material only.

(4) Each layer must be compacted thoroughly using a heavy smooth-wheel roller or grid roller, but much help may be derived from the compacting effect of traffic. In the latter

case, ruts and soft spots must be filled with fresh material as they develop.

(5) Additional layers may be spread and compacted as described above until the required thickness is attained.

1722. Macadam. Macadam may be used either dry, water bound, or grouped with bitumen or cement. Dry and water bound construction is dealt with in section 88: bituminous grouting in section 95: cement grouting in section 103. Macadam consists of coarse crushed or broken stone, or screened gravel of gauge about 40 to 75 mm maximum, the voids in which are filled with material ranging in size from 6 mm to dust. Above 6 mm gauge, the material is referred to as road metal; 6 mm gauge down to dust is termed screenings. Screenings from a rock crusher are ideal for filling the voids.

1723. Gravel sand See section 87

1724. Sand clay mixture. See Section 85

1725. Stabilized soil. See Section 86.