

306.00 FOUNDATION COURSE

306.01 DESCRIPTION

The principal functions of a foundation course are:

1. To provide a means of distributing water, which leaks through cracks and joints, in a uniform manner throughout the subgrade, thus avoiding differential swell and frost heave.
2. To prevent pumping at joints, cracks, and edges.
3. To strengthen support under joints, thus avoiding faulting.
4. To provide uniform support for the entire slab, thus reducing cracking.

For these reasons, the construction of foundation course deserves close inspection.

SSHC Section 307 describes foundation courses. All types require the use of mineral aggregate for foundation course, fine sand and water and all must be mixed in a twin pugmill mixer.

306.02 MATERIAL REQUIREMENTS

Generally all borrow pits are the contractor's responsibility to obtain and close.

306.03 CONSTRUCTION METHODS

Preparation of Subgrade

See plans and specifications for material requirements. Sampling procedures in the *Materials Sampling Guide* shall be followed.

Subgrade preparation will normally be accomplished under a contract item in *SSHC Section 302*. However, it is important that the moisture and density conditions specified under the subgrade preparation item be maintained until the foundation course is laid. Obtaining the moisture and density conditions is required by *SSHC Subsection 302.01*.

Mixing, Laying and Compacting

SSHC Subsection 307.03 require that the mineral aggregates and the pulverized soil binder be mixed in an approved pugmill. The purpose of this requirement is to produce a uniform and intimate mixture of the binder, water and aggregates and to make it possible to place this mixture, spread it and compact it to a firm foundation, without incorporating additional material from the subgrade. Accordingly, hauling should not be permitted when moisture conditions in the subgrade are such as to cause ruts and the resulting contamination of the base course material.

Uniformity of thickness of the compacted layer is very important. Since the Specifications require trimming of the subgrade and the base course by the use of automated electronically controlled equipment, accurate thickness control must be demanded.

Proper control of moisture content is significant for two reasons:

1. Uniformity of moisture content at the proper level aids in obtaining uniform density, meeting requirements.
2. Uniform moisture content, thoroughly distributed throughout the binder and aggregate mass, aids in the development of the necessary cohesion.

In the laydown of foundation course, it is best to lay the full thickness in one layer, when feasible. If there is only one layer, slippage between layers, a common problem in granular base courses, will be avoided.

After completion of the trimming operation, cross sections should be taken on the surface of the soil aggregate base course at 600 mm (2 feet) transverse intervals and at 300 m (1000 ft) longitudinal intervals matching the locations of the cross sections taken on the subgrade and recorded in the field book.

The Materials and Tests "*Materials Sampling Guide*" requires that density tests be made a 300 m (1000 foot) intervals or closer. At the time the density tests are made, following the trimming operation, the thickness of the soil aggregate base shall be carefully measured and recorded as documentation that the thickness requirements have been met. The thickness measurements shall be considered to represent only that width constructed and trimmed in a single operation. If any of these measurements show a deficiency from planned thickness of 12.5 mm (1/2 inch) or more and if payment is to be made by the square meter, additional measurements shall be made to define the extent of the soil aggregate base course shortage.

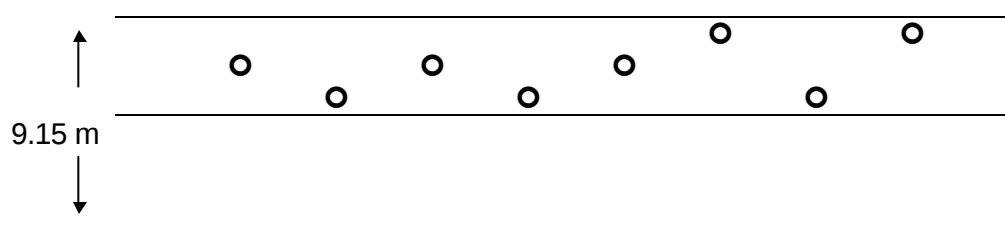
If a measurement shows a deficiency in thickness, a check measurement shall be taken 3 m (10 foot) either side of this location parallel to the centerline of roadway. If both check measurements fall within the 12.5 mm (1/2 inch) tolerance permitted, no deficiency is to be considered. If one or both are deficient in thickness, further checking shall be made at 15 m (50 foot) intervals from the original measurement and parallel to the centerline of roadway until a thickness within the tolerance is found in one or both directions as the case may be. Between this point and the location 15 m (50 foot) back, determine the point within 3 m (10 foot) at which the soil aggregate base course is within the tolerance permitted. If both categories of deficiency occur, the same procedure shall be used to determine the beginning and ending points of the two categories. The width of the deficiency shall be considered to be the full width constructed and trimmed in that particular operation.

Measurements for determining the thickness should be made at a maximum spacing of 150 m (500 feet) directly behind the trimming operation. This will prevent the priming of any deficient section that the contractor has the option to remove or that must be removed and replaced in accordance with the specifications.

The Project Manager shall enter all measurements and locations where made in a field notebook. In some cases a sketch may be necessary to clarify a nonpay area. Deductions in the pay quantity of the soil aggregate base course are to be computed and made by the field Project Manager.

The following examples shows measurements taken in a 150 m (500 foot) section where a thickness deficiency has occurred.

THICKNESS CORES



Measurement No.	Location	Actual Thickness	Specified Thickness
1	1 m Lt. cl Sta. 1001+50	81 mm	100 mm
2	1001+40	93 mm	100 mm
3	1001+60	79 mm	100 mm
4	1002+00	75 mm	100 mm
5	1002+50	79 mm	100 mm
6	1003+00	100 mm	100 mm
7	1002+90	91 mm	100 mm
8	1002+80	84 mm	100 mm

Limits of deficient area in the category of 12 mm to 25 mm deficient equal Station 1001+40 to Station 1002+90.

Non Pay Square Meters Soil Aggregate Base Course (Contractor's Option)

$$150 \text{ m} \times 9.15 \text{ m} = 1350 \text{ m}^2$$

Portland Cement Treated Foundation Course Requirements:

The time schedules given in the specifications should be strictly enforced. Once hydration of the cement is started, the process continues and cementing characteristics of the cement will be lost if aggregate and cement are not quickly compacted to their final orientation within the foundation course.

Compaction operations should be completed as quickly as possible. If rolling continues for too long a period, the bonds which the portland cement is trying to establish are broken in the upper part of the layer.

Prime coat application, which serves to some extent as protection against the infiltration of moisture, should not be delayed. If moisture penetrates the portland cement treated foundation course and enters the subgrade, a very serious problem can result.

Maintenance of the Compacted Base Course and Prime Coat

Prime coats should be applied as soon as possible after laydown and compaction procedures are completed, to protect against soaking of the base course by rainfall. The second laydown of a base course almost always is inferior to the first, especially if drying operations on the subgrade have been made necessary as a result of rainfall percolating through an unprotected base course.

The specifications provide that after the base course has been compacted to the required density and shaped to the typical cross section, the base course and prime coat shall be maintained by the contractor until subsequent construction has been completed.

306.04 BASIS OF PAYMENT

If the foundation course is to be paid for by the megagram (ton), deductions should be made for excess water.

Foundation course measured by the m² (square yard) is not directly measured but is the quantity of overlying pavement. (See *SSHC Subsection 307.04*)