

303.00 SUBGRADE PREPARATION AND SHOULDER SUBGRADE PREPARATION
(See SSHC Section 302)

303.01 CONSTRUCTION METHODS

Since the performance of these items is accomplished to prepare the subgrade to support rigid or flexible pavement, and since the performance of either type of pavement is strongly affected by the moisture and density conditions of the subgrade at the time of placement of the pavement, the inspection of work under this subsection is of the highest importance. While staying within the Specification moisture and density limits, the following points should be kept in mind:

- In order to achieve high subgrade strength for flexible pavements, soils should have high densities and low moisture contents.
- In order to avoid differential swell in subgrade below rigid pavements, soils should have lower densities and higher moisture contents.
- In order to avoid roughness due to differential heave, subgrade soils should have uniform moisture and densities.

Studies have shown that a wide range of moistures and densities may be found in subgrades thought to be uniformly compacted to the satisfaction of the construction inspectors. It is believed that this lack of uniformity may to some extent be due to the tendency to take samples in locations thought to be representative (thus actually being a median condition) rather than taking samples at random locations. See *Materials Sampling Guide* for directions on how to sample the subgrade.

@ Another problem which may result in improper moisture and density control is the erroneous identification of the soil type. A review of the Materials and Research "Earthwork Engineering Guide" is recommended.

Settlement of shoulder pavement relative to the driving lanes and a resulting maintenance operation to eliminate a drop-off condition is quite common. Extra care in compaction of subgrade adjacent to the pavement edge is necessary to alleviate this problem area.

The item of work "Subgrade Preparation" is designated as the procedure to be followed in preparing the grade on projects where the surfacing will be constructed.

It is particularly important to test the portion of the roadbed which will underlie the outer edges of the surfacing. Frequently, this portion of the roadbed will be found to be high in moisture content and have less than satisfactory density due to freezing and thawing or lack of traffic compaction. If the moisture or density of this outer portion is less than satisfactory, difficulty may be experienced in properly constructing and compacting the overlying pavement.

This work provides for adjusting grade lines, scarifying, drying, shaping and compacting of the upper 150 mm (6 inches) of the roadbed ahead of surface or base construction. The moisture and density requirements will be shown in the plans.

The Specifications require that the correction of failures below the upper 150 mm (6 inches) of the subgrade will be performed on an "Extra Work" basis.

After the operations of Subgrade Preparation, Shoulder Subgrade Preparation and Subgrade Trimming are completed, the Project Manager should arrange to measure the cross sections of the trimmed subgrade surfaces. The measurements should be taken at 600 mm (2 feet) intervals across the subgrade from side to side and the results recorded in the inspector's notebook. The sections should be taken with a tight string line stretched across the top of the forms or across the reference lines and measurements made to the nearest 3 mm (1/8 inch) from the cord to the subgrade. In some cases it may be advantageous to perform this checking by instrument which is an acceptable method.

At the beginning of the operation checks should be made to assure that the equipment is in proper adjustment and the operating ability is such as to produce the desired template. As a minimum, after having checked the beginning operation, the template should be checked each 300 m (1000 feet) and the results recorded in a field book. In the case of urban work, or when the performance of the work is such that it is questionable, the frequency of checks should be substantially increased to assure the correctness of the grade. The contractor should be informed of any areas that will need correction before subsequent operations proceed.

The Specifications provide a maximum trimming tolerance from the staked elevation when preparing the subgrade for placement of asphaltic concrete or a combination of base and asphaltic concrete or armor coat. There are no specified trimming tolerances when preparing the subgrade for placement of foundation courses or concrete pavement. However, there are "contractor self-imposed tolerances" due to thickness tolerances of the subsequent surface structure. Thus, due to the nature of the specifications, the tolerances imposed by the contractor should in reality be even more rigid than those specified for flexible pavement.

Subgrade preparation is not accepted until the overlying pavement has been placed. Any damage to the subgrade prior to placement of the overlying pavement shall be corrected by the contractor at no additional cost to the Department.

Prime Coat (*SSHC Section 517*)

The special provisions or plans may require the application of a prime coat after the trimming operation has been completed. The Project Manager may desire a prime coat due to actual job conditions when one has not been provided for. The District Engineer may be consulted for advice and for procedure when a prime coat is needed and has not been provided for in the project documents.

Subgrade Preparation After Removal of Existing Approach Slabs

SSHC Subsection 603.05, Paragraph 8 states that "the work of preparation of the subgrade under the pavement approaches shall not be measured and paid for directly but shall be considered subsidiary to the concrete pavement." This is intended to apply to approach slabs placed on new subgrade and not to the existing subgrade found after the removal of existing approach slabs.

When existing approach slabs are removed and the existing subgrade must be corrected, corrective work at depths greater than 150 mm (6 inches) shall be paid for as "extra work" (as per *SSHC Subsection 302.05*, Paragraph 5).

303.02 METHOD OF MEASUREMENT

Note in the *SSHC Subsection 302.04* that when measured by the square meter, the area is the plan quantity for the overlying paved surface. When measured by the station, each shoulder is measured separately without regard to width (100 m or 100 foot stations).

304.00 SUBGRADE STABILIZATION (SSHC Section 303)

304.01 DESCRIPTION

The principal function of subgrade stabilization is to provide a stable grade for subsequent construction.

304.02 MATERIAL REQUIREMENTS

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See the Materials and Research Sampling Guide for sampling and testing requirements.

Obtaining Materials From Local Pits

In general, the contractor must obtain all off site pits and close them with the landowner. The Department no longer tracks site releases for contractor provided pits.

304.03 EQUIPMENT

The inspector should carefully check the contractor's equipment and calibrations. Pay quantities and other important measurements may be based on some of the equipment and we need to make certain that they conform to the requirements of the Specifications and the special provisions.

304.04 CONSTRUCTION METHODS

This item consists of the stabilization of non-cohesive sand by the addition of a natural soil binder material. In order to insure satisfactory performance of the overlying pavement, especially if it is of the flexible type, the following points should be kept in mind:

1. Silt clay soils exhibit poorer support for pavement if they exist as thin layers over pervious sands than if they comprise the full depth of the subgrade. For this reason, the placement of a thin soil binder layer over the sand should be prohibited.
2. The minimum amount of soil binder required to support construction operations should be used. An excessive amount of binder causes the mixture layer to act as a silt-clay layer as in 1 above.
3. Thorough mixing of sand and soil binder is conducive to good performance.
4. A stabilized subgrade will allow paving equipment to travel over sandy areas.