2 Preparation of the Grade

Grade Preparation

Subgrade

Subbase

CHAPTER TWO: PREPARATION OF THE GRADE

A concrete pavement is only as good as the grade on which the pavement is placed. In this chapter, the importance of grade preparation, the various types of subbase that may be used under the pavement, maintaining the constructed grade until paving begins, and the final trimming of the subgrade and subbase are discussed.

GRADE PREPARATION

The preparation of the subgrade and base course is a very important step since these materials have a considerable impact on the riding quality of the concrete pavement. Concrete pavement may be placed on a prepared subgrade or on a base course. A cement concrete base is usually placed directly on an earth subgrade, while a concrete pavement is nearly always placed on subbase.

SUBGRADE

The top 6 in. of the subgrade is required to be compacted to 100 % of the maximum dry density within a moisture range. When special subgrade treatment is specified in the plans, the Contractor has several options to select from for achieving compaction. Section **207.04** specifies the requirements for each option. The depth required of the subgrade treatment is specified in the plans. Figure 2-1 is the typical section for fill and cut sections.

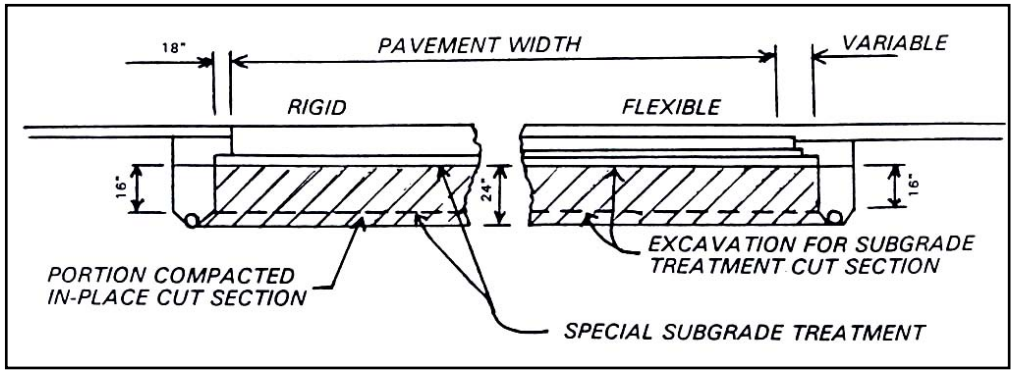

Figure 2-1. Fill and Cut Section

The subgrade is to be constructed so that the material has a uniform density throughout. Any soft, yielding, or other unsuitable material is required to be removed and replaced if corrective measures are not effective. Proof rolling is done just prior to placing the subbase or pavement as per Section **203.26**.

The uniform compaction, correction of unstable areas, and proof rolling of the subgrade should receive special attention at the form lines when forms are used for paving and at the track lines when the slip-form method is used. Settlement of the forms or tracks of the slip form paver due to poor subgrade stability results in a poor riding pavement.

The subgrade is required to be well drained at all times. No pavement or subbase may be placed if the subgrade is frozen or muddy.

The subgrade is required to be finished to within 1/2 in. of the true grade. When concrete pavement is placed directly on a subgrade, more accuracy is required. Although the specifications do not require an exact tolerance, there is a deduction for thin pavement. This deduction may be made for deficiencies greater than one tenth of an inch. In form paving, these tolerances are usually accomplished with a machine called a sub-grader which rides on the forms (Figure 2-2). When subbase is specified, the subgrade may be trimmed with a conventional grader. In slip form paving, an auto-grade machine with an automatic grade control sets the grade from a string line.

Figure 2-2. Form Paving Spreader

No equipment or traffic is allowed on the finished subgrade because distortion of the subgrade may occur if a weak soil condition exists or the subgrade is overly wet after a rain.

SUBBASE

Subbase is a foundation course that is placed and compacted on a prepared subgrade. Section **302** lists the materials and construction requirements for subbase.

The subbase consists of 3 in. of an aggregate drainage layer placed over an aggregate separation layer. For all alignments, the thickness of the separation layer is required to be 6 in.. The drainage layer consists of coarse aggregate size No. 8 in accordance with **904.03** and may be crushed stone or air-cooled blast furnace slag. The separation layer consists of coarse aggregate size No. 53 in accordance with **904.03**.

The preparation and placement of subbase is required to be in accordance with the applicable requirements of Section **302**. Compaction of the drainage layer requires two passes with a vibratory roller before trimming and one pass with a tandem roller after trimming.

After the final trimming and compacting of the subbase, depth determinations are made for each layer. These measurements are taken at a minimum frequency of one depth determination per each traffic lane for each 500 linear ft of each layer of subbase. A permanent record is required to be made of all depth checks and include the date, location, and thickness of all checks. This record accompanies the final construction record and is required to verify the quantity of material actually placed. If deficiencies are found in the thickness, appropriate measures are required to be taken. If more material is required, the additional material is mixed with the layer and the layer is re-compacted. Additional depth determinations are then obtained.

The width of the subbase is also checked and recorded. These checks are required to verify the quantity of material in cubic yards that were actually placed.