Construction Inspection Manual

Lexington-Fayette Urban County Government
Lexington, Kentucky

January 1, 2005

CHAPTER 10
BITUMINOUS PAVEMENT CONSTRUCTION

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10.1 Introduction

10.1.1 General

The quality of bituminous pavement construction is an important phase of construction that reflects directly on LFUCG's public image. Many other infrastructure construction components, such as sewer lines or pump stations, are soon forgotten by the public once they have been placed beneath the ground and covered. Problems that arise because of poor quality bituminous pavement construction, however, remain visible and may serve as a constant source of complaints long after a project is finished.

On infrastructure construction projects, the Inspector may be asked to monitor the construction of new pavements, the repair/resurfacing of existing pavements, asphalt mixes, and/or asphalt compaction. When completing these tasks, the Inspector shall remember the following basic objectives in bituminous pavement construction:

1. Support traffic loads;

2. Protect subgrade, subbase, and/or base from surface water;

3. Minimize loss of surface material;

4. Provide a reasonable surface texture;

5. Provide flexibility for subbase deflections; and

6. Provide resistance to weathering.

These basic objectives shall have been incorporated into the design of the pavement sections or repair efforts. One of the Inspector's primary tasks is to understand how field observations of actual construction conditions may affect these basic objectives of road construction and to relay any concerns to the Engineer.

Prior to construction of new pavements or the repair/resurfacing of existing pavements, the Inspector shall have a thorough understanding of Contract Documents, the geotechnical report, LFUCG Roadway Manual, relevant *LFUCG Standard Drawings*, and the individual components of the pavement section. In some instances, the project specifications may dictate the use of lime stabilization or cement modification (or other means) to stabilize bearing materials. In these instances, the Inspector shall obtain the appropriate construction specifications, product data, or reference materials and become familiar with the particular job requirements. At other times, the Contract Documents may place logistics constraints on the Contractor (i.e. the Contractor may be required to pave certain areas before others, etc.). The Inspector shall observe the Contractor operations and notify the Engineer when these constraints are not being met.

The Contract Documents may require the Contractor to submit material certifications, aggregate sieve analyses, and bituminous pavement mix formulas. Prior to construction, the Inspector shall verify that the appropriate submittals have been made and approvals received. The status of

contractor submittals shall be tracked on the form presented in Section 3.0. All Inspector observations and field test results shall be documented using the Daily Field Report form shown in Section 3.0.

10.1.2 Definitions

Aggregate - A hard granular material of mineral composition such as sand, gravel, or crushed stone.

Asphalt - A dark brown to black cementitious material in which the predominating constituents are bitumens that occur in nature or are obtained in petroleum processing. Asphalt is a constituent in varying proportions of most crude petroleums.

Asphalt Base Course - A foundation course or pavement layer consisting of well-graded mineral aggregate mix bound together with asphalt material on which successive course(s) are placed.

Asphalt Surface Course - The top course of an asphalt pavement, sometimes called asphalt wearing course.

Cement Modification - The modification of a soil mass through the addition of measured amounts of Portland cement and water that is thoroughly mixed and compacted.

Cutback Asphalt - Asphalt cement that has been liquefied by blending with petroleum solvents. Upon exposure to the atmosphere, the solvents evaporate leaving the asphalt cement to perform its function.

Dense Graded Aggregate - An aggregate that has a particular size distribution such that when it is compacted, the resulting voids between the aggregate particles, expressed as a percentage of the total space occupied by the material, are relatively small.

Emulsified Asphalt - Asphalt cement that has been liquefied by blending with water and an emulsifying agent. Upon exposure to the atmosphere, the water evaporates, and the asphalt cement is left behind to perform it function.

Granular Base Course - A layer of dense graded aggregate placed and compacted on the subgrade to serve as a stable foundation upon which asphalt pavement is placed.

Lime Stabilization - The addition of lime to increase or maintain the stability of a soil mass or to otherwise improve engineering properties.

Pugmill - Type of mixer used to combine dense graded aggregate base material with the amount of water necessary to achieve proper compaction in the field.

Resurfacing - A supplemental surface or replacement placed on an existing pavement to restore its riding qualities or increase its strength.

Subbase - A layer of aggregate or soil of planned thickness and quality placed on the subgrade soil as a foundation for the granular base course. The upper portions of the subgrade may also be improved with cement modification, lime stabilization, or geotextile aggregate combinations, and this improved layer can be termed the subbase.

Subgrade - The portion of a roadbed surface, which has been prepared as specified, upon which a subbase, base, base course, or pavement is to be placed.

Swale - An elongated depression in the land surface that is normally without flowing water.

Tack Coat - A sprayed application of an emulsified asphalt to an existing pavement, prior to placing the surface course. The purpose of the tack coat is to promote a bond between the existing pavement and the course that is to be placed over it.

Wedge - To apply one or more asphalt courses of variable thickness to eliminate irregularities on an existing pavement surface prior to resurfacing.

10.2 New Pavements

New pavements are typically comprised of four components. The prepared roadway bed is typically called the subgrade. The subgrade may consist of natural soils or an approved soil fill. In some instances, the uppermost surface (6-18 inches) of the subgrade is modified to improve bearing characteristics and increase stability. This modified or improved zone of the subgrade is sometimes called the subbase. The subbase may also consist of select materials, such as natural gravels or merely select borrow material. The granular base course typically overlies the subgrade (and subbase) and generally consists of dense-graded aggregate (DGA). The granular base is followed by a mixture of asphalt and coarse-grained aggregate called the asphalt base course. The final (top) component of the bituminous pavement section is the asphalt surface course, which is generally thinner than the underlying base course, contains smaller aggregates, and more bitumen. Figure 10.1 illustrates the typical components of a pavement section.

The thickness and composition of the pavement section is typically based on an engineering design utilizing the site-specific soils. Soil samples are normally collected during the geotechnical exploration of the site and are subjected to tests that indicate their acceptability for bearing materials. A typical test to indicate acceptability of bearing medium is the California Bearing Ratio (CBR) (ASTM D 1883) test. Unfortunately, in Fayette County, many of the residual soils have high clay contents and are poor bearing media, (i.e., low CBR). High clay contents typically mean poor drainage characteristics and low long-term strengths. Consequently, many pavement designs in the Fayette County area incorporate the use of subgrade modifications such as additions of cement or lime, biaxial geogrids, filter fabric or aggregate subbases. Pavement sections may also incorporate means to improve natural drainage characteristics such as piping networks or the addition of open-graded subbases. The Inspector shall be familiar with the descriptions of soils utilized in the pavement design, and have a basic understanding of the drainage requirements so that he/she is able to identify changed subgrade and drainage conditions and bring them to the attention of the Engineer. In addition, the Inspector shall verify that "No Parking" signs have been erected 24-hours prior to commencement of paving.

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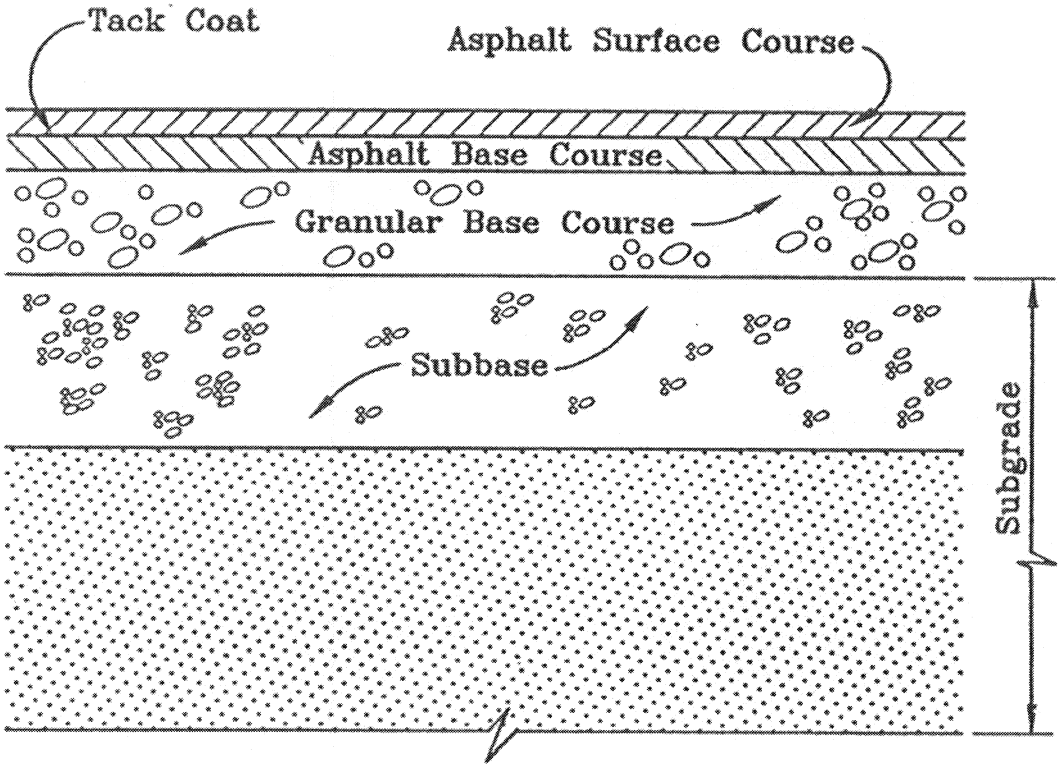
FIGURE 10.1
Typical Components of a Pavement Section

Typical Pavement Section



10.2.1 Subgrade

Section 5.0 of this manual presents the Inspector guidelines for earthwork as it relates to clearing and grubbing, placement of fills, compaction, undercutting, excavations, etc. All of the earthwork components discussed therein are necessary so that a stable pavement subgrade can be achieved. Unless otherwise provided for in the Contract Documents, several items shall be verified by the Inspector prior to establishing subgrade competency. These items include:

1. Verify that any bedrock identified at the subgrade level has been undercut to the depth specified in the Contract Documents.

2. Verify that utilities which traverse the roadway alignment have been installed,

3. Verify that the subgrade is free from ruts, large stones, and excessive dust,

4. Verify that the subgrade elevation is correct according to the cross-sections and alignment, and

5. Request a subgrade proof-roll test.

Regarding items 1 through 4, any noteworthy observations shall be brought to the attention of the Engineer. These verifications will help reduce the amount of interruptions in the paving operations and future discontinuities in the pavement surface. Regarding item 5, the Inspector shall request that the roadway subgrade be subjected to a subgrade proof-roll test so that soft, wet, or pumping areas may be identified. The minimum total weight of the loaded dump truck shall be 37 tons. The truck shall be operated at walking speed over the entire subgrade. Any excessive deflections such as rutting or pumping may require stabilization measures and shall be brought to the attention of the Engineer. The Inspector shall observe the operations to verify correct speed and ensure all areas of the subgrade are covered.

Typical treatments of soft or wet areas of the pavement subgrade include removal and replacement (undercutting), “working-in” No. 2 stone, or installation of a geogrid/geotextile system and crushed stone. The extents and performance requirements of such improvements shall be set forth in the Contract Documents or as directed by the Engineer.

Other means to stabilize the subgrade are available. Lime stabilization or cement modification (KTC Section 304) may be required and the Inspector shall become familiar with the requirements in the Contract Documents for each. On projects that require these special treatments, the Inspector shall consult with the Engineer to obtain a revised Proctor curve(s), compaction requirements, and construction operations to be utilized. The Inspector shall be aware that changes in soil subgrade conditions (material types, moisture conditions, etc.) may have a direct influence on the type and extent of stabilization/modification being utilized and he/she shall stay in close contact with the Engineer. Any deviations from the Inspector's understanding of the required soil conditions, compaction requirements, application rates or construction operations and procedures shall immediately be reported to the Engineer.

The pavement subgrade shall be compacted to a uniform density throughout according to the requirements of the Contract Documents. If the density of the subgrade has been diminished by exposure to weather, after having been previously compacted, it shall be recompacted to the required density and moisture content.

Observations made shall be reported on the Pavement Subgrade Inspection Form presented - Section 3.0. At the completion of subgrade verification and preparation operations, the Contract Documents may require the installation of subgrade drainage systems or perforated pipe underdrains. *LFUCG Standard Drawings* shall be utilized where appropriate.

10.2.2 Subbase

Subbases, if required by the Contract Documents, may consist of select materials, such as natural gravels, that are stable but that have characteristics that make them not completely suitable as granular base courses. Subbases may also be of stabilized soil or merely select borrow. The purpose of a subbase is to permit the building of relatively thick pavements at low costs. Thus, the quality of subbases can vary within wide limits, as long as the thickness and material requirements set forth in the Contract Documents are fulfilled. Because subbases may consist of a variety of material types and consistencies, they can be grouped according to the nature of quality control procedures that shall be implemented during placement. Typical groupings utilized in the Contract Documents are "Soils" and "Aggregates."

Select borrow soils are typically placed in an engineered fashion as described in Section 5.0 to a specified density and within a certain percentage of optimum moisture content. The Inspector shall verify that the necessary soil samples have been obtained and that the proper tests have been performed. The Inspector shall assist the Contractor with obtaining representative samples from the proposed borrow area(s). Further, the Inspector shall review the results of the testing to ensure that the soils fulfill the requirements of the Contract Documents. Such information may include a complete soil classification (ASTM D 2487), CBR, and Proctor moisture-density relationship (ASTM D 698 or ASTM D 1557). The soils shall be placed in accordance with the Contract Documents that usually include a maximum loose lift thickness of 8 inches and a compacted density of 95 percent of the standard Proctor maximum dry density.

Aggregate materials utilized as subbase shall be placed in accordance with the Contract Documents. Aggregates with a small percentage of fines are typically bladed in place and tamped to minimize voids and bridging. Aggregates with a greater percentage of fines, such as dense-graded aggregate (DGA), are typically compacted to a certain percentage (usually 84 percent) of the solid volume density determined from the oven-dry bulk-specific gravity (KM 64-607).

If the top surface of the subgrade has been modified with the application of cement or stabilized with lime, the Engineer or Contract Documents may treat this zone as a subbase. In any case, the precautions and items to observe for such improvements are noted in Section 10.2.1. The Inspector shall also be aware that the pavement section may also include aggregate-geogrid or aggregate-geotextile layers. The Inspector shall become familiar with the construction techniques discussed in the Contract Documents as well as their testing requirements. Under all circumstances, the Inspector shall verify that construction materials, specified depths or

thicknesses and construction practices are implemented in the field as specified in the Contract Documents. Any deviations shall be brought to the attention of the Engineer.

10.2.3 Granular Base Course

The granular base course, unless stated otherwise in the Contract Documents, shall consist of compacted dense-graded aggregate (DGA) meeting the requirements set forth in Section 805 of the Kentucky Transportation Cabinet's (KTC) Standard Specifications for Bridge and Road Construction. The Contract Documents may require that the DGA be obtained from a previously approved source. If the DGA source has not previously been approved, the Contractor may be required to submit results of physical tests performed on the material to verify that it meets the requirements referenced above. The Inspector shall assist the Contractor in obtaining a representative sample and in its care and handling.

The DGA shall be applied in thicknesses specified in the Contract Documents. Typically, these lifts are no less than 3 inches and no more than 6 inches in thickness. Each lift of DGA shall be compacted to a density specified in the Contract Documents that is generally no less than 84 percent of the solid volume density based on the oven-dry bulk specific gravity as determined by KM 64-607. A typical minimum frequency for field density testing of DGA placement is one test per 2,000 square feet with a minimum of one test per shift during which DGA is placed. The DGA shall be compacted using a vibratory roller or vibratory plate.

In addition to the previously stated guidelines for compaction equipment and lift thickness, the Inspector shall pay close attention to the moisture content of the DGA base during placement and compaction. Before arriving at the site, the DGA shall be adequately mixed with water in a pugmill. During transportation and storage on site, the DGA shall be covered to prevent loss of moisture. DGA shall not be stored or stockpiled at the site unless otherwise provided for in the Contract Documents. If drying of the DGA occurs, the Contractor shall add water to the DGA and shall thoroughly mix the material prior to its placement. A moisture content value between five and seven percent at the time of compaction is typically adequate for the placement of limestone DGA.

10.2.4 Asphalt Base and Surface Courses

An asphalt base course is an intermediate asphalt course placed between a granular base course and an asphalt surface course. The surface course represents the top portion of the asphalt pavement. These asphalt mixes consist of well-graded aggregate and asphalt cement. The aggregate gradation of the base is typically coarser than that of the surface mix. In addition, in a typical mix, the asphalt content will range from 4 to 8 percent, by weight. The aggregate gradation and asphalt content requirements shall be specified in the Contract Documents. The Inspector shall compare test results and certifications submitted by the Contractor with the requirements to ensure compliance.

The requirements of the equipment used to spread and compact bituminous pavement shall meet the requirements of the Contract Documents. The paver must spread the mixture without tearing the surface and must strike a finish that is true to the required cross section, uniform in density and texture, and free of irregularities. The speed of the paver shall be adjusted as necessary to

that speed which provides the best result for the type of mixture being placed. The Inspector shall observe each course immediately after striking off and before rolling for irregularities that require correction. Fat sandy droppings shall be removed and fat areas shall be removed and replaced with satisfactory material. Any portion of the pavement course that is defective or that shows excessive segregation shall be removed and replaced with suitable material.

Well proportioned asphalt mixes compact readily if spread and rolled at proper temperatures. Compaction requirements vary widely from project to project and consequently, the Contract Documents shall be referenced in this regard. Rolling shall start immediately after the material has been spread by the paver, provided undue lateral movement does not take place under the roller. If rolling causes displacement of the material, the affected areas shall be loosened at once with an asphalt rake and restored to the original grade with loose material before re-rolling. Rolling shall be done with care to prevent undue roughening of the pavement surface.

Rolling of a longitudinal joint shall be done immediately behind the paving operation. The initial, or breakdown, pass with the roller shall be made as soon as it is possible to roll the mixture without cracking the mat or having the mix picked up on the roller wheels. The second, or intermediate, rolling shall follow the breakdown rolling as closely as possible and shall be done while the paving mix is still at a temperature that will result in maximum density. The finish rolling shall be done while the material is still workable enough for removal of roller marks.

Roller wheels shall be kept moist during compaction, with only enough water to prevent the wheels from picking up the asphalt mixture. Rollers shall move at a slow but uniform speed generally with the drive roller or wheels nearest the paver. The line of rolling shall not be suddenly changed or the direction of the roller suddenly reversed.

The pavement course thicknesses and construction tolerances shall be specified in the Contract Documents. The surface of each course shall be checked with templates, straightedges, and/or stringlines for uniformity. These checks can be made by the Contractor in the presence of the Inspector. All irregularities exceeding the allowable tolerances must be repaired as required by the Contract Documents or as directed by the Engineer. The Inspector must note all checks and measurements made of pavement surface uniformity in the Daily Field Report and report any repairs made.

10.2.5 Tack Coat

The purpose of the tack coat is to increase the bond between old and new surfaces. It may be required on new pavements between the binder and surface courses or on repair of existing pavements. If the tack coat is too heavy, the tack coat may act as a lubricant between the two surfaces, causing the mat to slip when rolled. If the tack coat is not adequate, the mat will not bond to the underlying course properly and may slip under the roller, causing waving or cracking of the mat being placed. In either case, subsequent raveling will occur and eventually a deterioration of the surface will develop.

Unless otherwise stated in the Contract Documents, the tack coat shall be type SS-1h. Prior to applying the tack coat, the area to receive pavement shall be cleaned. The tack coat shall be

applied well in advance of the paving operation to allow all water to evaporate before the surface course is placed. This chemical process is termed "breaking" or "setting." One way to determine when the material has set is that its color will change to dark brown within a short time after application, with the exact length of time depending on the ambient and pavement temperatures. Work shall be planned so that no more tack coat than is necessary for the day's operation is placed on the surface. Existing traffic and weather conditions may curtail the distance tack can be placed ahead of the paving operation.

10.3 Existing Pavements

Many LFUCG projects require construction in pavement areas. Following construction, disturbed areas must be repaired and repaved appropriately. The Contract Documents may also require resurfacing of existing pavements.

Criteria governing the restoration of damaged pavement areas shall be included in the Contract Documents. All cutting back and restoration of existing pavement damaged due to trenched utility construction shall conform with the *LFUCG Standard Drawings* unless otherwise required by the Plans and Specifications.

10.3.1 Preparation of Paving Areas

Prior to placing surface course materials, all areas to receive pavement must be properly prepared. Cut-backs must be constructed on each side of utility trenches in accordance with the Contract Documents or *LFUCG Standard Drawings*, as applicable. The Inspector shall observe that sections of pavements to be removed are cut in straight lines in such a manner that all joints between existing and new pavement will be smooth and continuous. If additional pavement must be removed, other than the pavement that was removed during initial trench construction, it shall be cut using a pavement saw in such a manner that a straight transition zone is provided for pavement restoration. All cutting of the pavement shall extend to the subgrade and the affected area shall be completely excavated. Within the limits of the cut-backs the base, and subgrade immediately below the surface course shall be replaced with concrete, as shown in the *LFUCG Standard Drawings*.

In some instances, the Contract Documents may require the placement of an asphalt base course prior to resurfacing. In these instances, the areas to receive an asphalt base course shall be cleaned. The remaining discussions in Section 10.2 regarding asphalt base courses apply.

During blasting operations, some pavement areas may heave or otherwise be damaged. All areas damaged because of blasting must be cut and excavated to the top of the subgrade. As in trench excavation, the cutting must be performed so that continuous straight lines are formed between the existing and new pavements.

On projects in which the road affected by the trench is to be resurfaced entirely, edge keys must be provided at locations where the old and new asphalts meet. Edge keys are necessary to provide a smooth transition between the new and existing surface courses and to prevent spalling of the new asphalt. Edge key details are shown in the *LFUCG Standard Drawings*.

Prior to any resurfacing, all manholes, storm sewer inlets, and catch basins must be adjusted to the proper elevations. On drainage projects, the depth of all swales located within driveways or entrances shall be checked prior to paving to verify that safe traffic crossing can be made.

10.3.2 Surface Course

The placement of the surface course is slightly different for patching and resurfacing pavement operations. For jobs in which the pavement is to be patched, the surface course shall be placed

and compacted to the required thickness, in such manner that the top of the surface course is level with the existing pavement. Care shall be exercised to ensure that a smooth transition occurs between the existing pavement and the pavement patch. Following placement of the surface course, the perimeter of the patched area shall be sealed with an approved sealer compound.

For jobs in which the entire pavement is to be resurfaced, special precautions shall be taken prior to placing the surface course. The existing pavement shall be checked for any weak or cracked areas, and the necessary repairs shall be made in advance of the placement of the surface course.

In areas where the existing asphalt is distorted, the construction of leveling courses or wedges may be necessary to obtain a smooth asphalt surface. A leveling course is an asphalt mat of varying thickness used to eliminate irregularities in the contour of the existing surface, prior to placing the surface course. Wedges, on the other hand, are a series of patches of asphalt plant mix used to level sags and depressions prior to placement of the surface course. If distortion of the existing asphalt is not severe, a leveling course applied with a paver should be sufficient for removing irregularities. If the distortion of the existing asphalt is severe, then wedges must be used to restore the pavement surface.

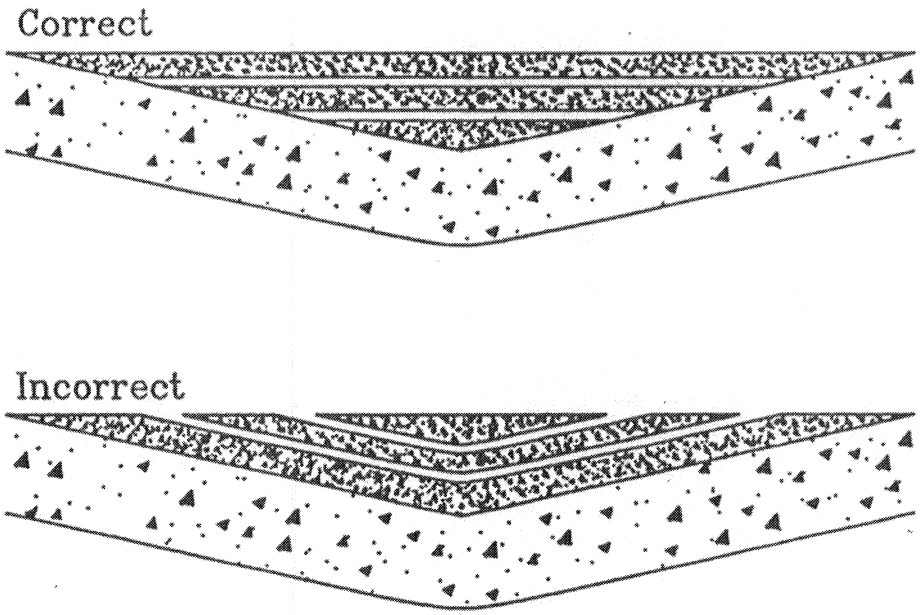
Leveling wedges should be placed in two layers if they are from 3 to 6 inches in thickness. Wedges thicker than 6 inches should be placed in individually compacted layers not exceeding 3 inches in thickness. In placing multiple layers, the layer of shortest plan dimension shall be placed first with the successive longer layer or layers extending over or covering the shorter ones. If incorrect methods are used, there is a tendency of a series of steps to develop at each joint because of the difficulty of feathering out asphalt mixes at the beginning and end of a layer. Bumps are very likely to form at these improper joints after the placement of the surface course. Correct and incorrect procedures for placing leveling wedges are illustrated in Figure 10.2.

After all necessary surface repairs have been made to the existing asphalt, including manhole adjustments, the entire area to receive pavement shall be cleaned. The existing pavement shall be hosed down and swept accordingly. A tack coat shall be applied to the area sufficiently ahead of the paving operation to allow breaking of the tack coat (see Section 10.2.5). After all preparations have been completed, the surface course shall be placed and compacted to the required thickness.

When the placement of pavement results in an abrupt vertical transition adjacent to the shoulders, the contractor shall place additional pavement so as to provide a smooth transition from the pavement surface to the original shoulder. The bituminous surface course shall be tapered at driveways and entrances to a feather-edge at the edge of the pavement. Edge keys are not necessary at driveways and entrances.

	CONSTRUCTION INSPECTION MANUAL	FIGURE 10.2 Leveling Wedges

Leveling Wedges



10.4 Inspection of Asphalt Mixes

All asphalt mixes used for infrastructure construction projects shall be inspected prior to placement. Some projects require only limited use of asphalt mixes. The inspection on these projects shall consist of observing the asphalt mix prior to placement and noting any inconsistencies. Guidance on the level of inspection and conformance testing shall be sought from the Contract Documents and the Engineer. Any asphalt mix delivered to the project site that is deemed to be inadequate by the Inspector shall be brought to the Contractor's attention immediately. Rejection of the asphalt mix shall be exercised as a last alternative, if corrective measures are not taken.

Typically, asphalt mixes used on projects should be composed of a well-graded aggregate mixture containing no particles larger than 3/8-inch, with an asphalt content of 4 to 8 percent. The temperature of the asphalt mix during placement shall range between 225°F to 325°F. During asphalt inspection, the following criteria shall be used for judging the quality of the asphalt mix:

1. **Blue Smoke.** Blue smoke rising from the mix in the truck or in the spreading device may indicate an overheated batch. The temperature of the mix shall be checked immediately with an asphalt thermometer to ensure that the temperature does not exceed 325°F.

2. **Stiff Appearance.** A stiff appearance, or improper coating of the larger aggregate particles may indicate a cold mixture. The temperature of the mix shall be checked, and if it is below the optimum placing temperature, but within the specified range for placement of 225°F to 325°F, immediate steps shall be taken to notify the asphalt plant to correct the condition. If the temperature is below the specified range, the asphalt mix shall be rejected.

3. **Mix Slumped in Truck.** When loads have been arriving at the spreader with the material peaked, or domed up, and a load suddenly appears in which the material lies flat, or nearly flat, it may contain too much asphalt.

4. **Lean, Dull Appearance.** A mix that contains too little asphalt generally can be detected immediately in the truck or in the spreader by its lean, granular appearance, improper coating of the aggregates, and lack of the typical shiny black luster. Lack of sufficient asphalt in the mix can be detected on the road by a lean, brown, dull appearance on the surface and by unsatisfactory compaction under the roller.

5. **Rising Steam.** Excess moisture may be detected by steam rising from the mix when it is dumped into the hopper or the paver. The hot mix may be bubbling and popping as if it were boiling. The mix may also appear to contain too much asphalt.

6. **Segregation.** Segregation of the aggregates may occur because of improper handling of the mix. To avoid segregation, the asphalt mix shall be spread uniformly with a paver. If hand spreading is required, the asphalt mix shall be shoveled with care so that the material is not dispersed by "throwing" the asphalt mix into place.

7. **Contamination.** Mixes can become contaminated in a number of ways: by spilled gasoline, kerosene, or oil, or by rags, paper, or trash and dirt in or on the mixture. The contamination can be removed if it is not too extensive.

No paving shall be conducted between November 15 and April 1 without written permission from the Engineer. In addition, paving shall not be placed on any wet surface or when the ambient air temperature is less than the recommended minimum temperature presented below unless otherwise allowed by the Contract Documents or Engineer.

TABLE 10.1
TEMPERATURE LIMITATIONS

Bituminous Mixtures	Minimum Ambient Air Temperature for Placing (Degrees Fahrenheit)
Bituminous Concrete Surface, 1" thick or less	45
Bituminous Concrete Surface, thicker than 1"	40
Bituminous Concrete Base	35
Leveling and Wedging	45

During paving operations, the thickness and longitudinal dimensions of the asphalt shall be checked for conformance with the Contract Documents. Longitudinally, the finished surface of the binder course typically shall not deviate by more than 1/4-inch over a 10-foot length. The finished surface of the surface course typically shall not deviate by more than 1/8-inch over a 10-foot length. The cross slope of all courses shall not deviate from the specified cross-section by more than 1/4-inch in 5 feet.

10.5 References

10.5.1 Publications

Construction Inspection Guidance Manual, Louisville and Jefferson County Metropolitan Sewer District (MSD), Revised Edition, May 1993.

Lexington Fayette Urban County Government Standard Drawings, June 1997, Review Submittal.

Lime Roadbed Stabilization, Kentucky Transportation Cabinet, Special Provision No. 84, B(91).

National Engineering Handbook Section 19, Construction Inspection, United States Department of Agriculture, Soil Conservation Service, 1985.

Principles of Construction of Hot-Mix Asphalt Pavements, Asphalt Institute, Manual Series No. 22, 1983.

Soil Stabilization in Pavement Structures, United States Department of Transportation, Federal Highway Administration, 1979.

Standard Specifications for Road and Bridge Construction, Kentucky Transportation Cabinet Department of Highways, 1984.

The Asphalt Handbook, Asphalt Institute, Manual Series No. 4, 1989.

10.5.2 Test Methods and Specifications

ASTM D 698, *Test Method for Laboratory Compaction Characteristics of Soil using Standard Effort.*

ASTM D 1557, *Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.*

ASTM D 1883, *Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.*

ASTM D 2487, *Test Method for Classification of Soils for Engineering Purposes.*

KM-64-607, *Specific Gravity and Absorption of Coarse Aggregates*, Kentucky Transportation Cabinet (KTC), Kentucky Test Methods Manual.

KM-64-620, *Wet Sieve Analysis of Fine and Coarse Aggregates*, Kentucky Transportation Cabinet (KTC), Kentucky Test Methods Manual.

10.6 Bituminous Pavement Construction Inspection Checklist

10.6.1 New Pavement

	Yes	No	N/A	
(1)	____	____	____	Has the subgrade been constructed to the proper lines and grades?
(2)	____	____	____	Has the subgrade been proof-rolled?
(3)	____	____	____	Did the dump truck used to proof-roll the subgrade weigh at least 37 tons?
(4)	____	____	____	Was excessive rutting or deflection observed during the proof-roll?
(5)	____	____	____	Have soft or wet areas in the subgrade been observed?
(6)	____	____	____	Have soft areas and areas that rutted during proof-rolling been stabilized?
(7)	____	____	____	Do the Contract Documents specify construction of subbase?
(8)	____	____	____	Is cement modification or lime stabilization of the subgrade required?
(9)	____	____	____	If cement modification or lime stabilization of the subgrade is required, have the revised Proctor curves and lime/cement application rates been submitted?
(10)	____	____	____	Has the Contractor submitted the required material certifications, aggregate sieve analysis, and asphalt mix formulas?
(11)	____	____	____	Have the appropriate approvals been received for the above submittals?
(12)	____	____	____	Is the granular base course being properly placed and compacted?
(13)	____	____	____	Is the DGA at the proper moisture content during placement and compaction?
(14)	____	____	____	Have “No Parking” signs been erected at least 24 hours prior to paving?
(15)	____	____	____	Prior to placing the surface course, is the asphalt base course being cleaned and treated with tack coat?

	Yes	No	N/A	
(16)	____	____	____	Is the tack coat allowed to "break" prior to placing the surface course?
(17)	____	____	____	Are the asphalt base and surface courses being placed with equipment and machinery meeting the requirements of the Contract Documents?
(18)	____	____	____	Is the asphalt mix being properly rolled so that it is compacted to the required thickness?
(19)	____	____	____	Does all asphalt mix delivered to the site appear to be acceptable with respect to color, texture, asphalt content, and temperature?

10.6.2 Existing Pavement

	Yes	No	N/A	
(1)	____	____	____	Are all areas of pavement repair being cut back properly in straight lines so that joints between existing and new pavements will be smooth and continuous?
(2)	____	____	____	Do the pavement cut-backs conform to the Contract Documents and the *LFUCG Standard Drawings?*
(3)	____	____	____	Is the pavement being cut with a pavement saw?
(4)	____	____	____	Within the area of the cut-back, has the pavement been replaced in accordance with the Contract Documents and the *LFUCG Standard Drawings?*
(5)	____	____	____	In areas to be completely resurfaced, are edge keys properly constructed where old and new pavements are joined?
(6)	____	____	____	If required, have all manholes, storm sewer inlets, and catch basins been adjusted to the proper elevation?
(7)	____	____	____	If necessary, have wedges or leveling courses been placed properly?
(8)	____	____	____	Have all requirements of the Contract Documents been met regarding the placement of the driveway wedges and adjustment to pavement shoulders?