DIVISION 7
CONCRETE PAVEMENTS AND SHOULDERS

SECTION 700
GENERAL REQUIREMENTS FOR PORTLAND CEMENT CONCRETE PAVEMENT

700-1 DESCRIPTION

Perform the work covered by this section, which includes, but is not limited to, the construction of a single course non-reinforced Portland cement concrete pavement on a prepared base, in accordance with these *Standard Specifications* and with the lines, grades, thicknesses and typical sections shown on the plans or as directed.

The Department accepts concrete pavement with respect to strength, thickness and ride quality on a lot by lot basis subject to adjusted unit prices as provided in Sections 710 and 720.

Use any combination of equipment that shall effectively perform the necessary construction operations. Ensure the equipment is at the job site sufficiently ahead of the start of construction operations for the Engineer to examine thoroughly and approve.

Maintain all equipment in a satisfactory operating condition while in use on the work.

Submit for approval a Process Control Plan addressing all operations necessary in the production and placement of concrete pavement a minimum of 30 calendar days prior to placing concrete pavement.

700-2 CONCRETE PRODUCTION EQUIPMENT

Use batch plants, central mix plants and truck mixers that meet Section 1000.

700-3 CONCRETE HAULING EQUIPMENT

Transport concrete to the point of placement either in a truck agitator, a truck mixer operating at agitating speed or in non-agitating equipment meeting the provisions below. Bottom or belly dump equipment is prohibited. Provide and secure material covers on the equipment bodies for protection against detrimental environmental conditions.

Prevent the accumulation of hardened concrete in the delivery vehicles. Discharge all flushing water before charging with the next concrete load.

When using non-agitating hauling equipment, provide bodies which are smooth, watertight, metal containers with rounded internal corners equipped with vibrators and gates to discharge the concrete without segregation or damage.

For concrete hauled in a transit mix (ready mix) truck, use Table 1000-2 to determine the maximum elapsed time. For concrete hauled in other equipment, the elapsed time shall be 60 minutes or less, unless otherwise approved. Define the “elapsed time” as the period from first contact between mixing water and cement until the completion of the entire operation including placing, finishing, micro-surfacing and any necessary corrective work.

Deliver the concrete to the work site in a thoroughly mixed and uniform mass.

If at discharge, the concrete is not thoroughly mixed and homogeneous, the hauling distance, charging sequence, size of load, mixing time or any combination thereof shall be altered to meet these requirements; otherwise, use other equipment capable of delivering a thoroughly mixed and uniform concrete mass.

700-4 PREPARATION OF SUBGRADE AND BASE

Prepare the subgrade and base beneath Portland cement concrete pavement in accordance with the applicable sections of these Specifications and with a grading tolerance of ± 1/4 inch from the established grade on mainline lanes and a grading tolerance of ± 1/2 inch in all other areas. Use approved automatically controlled grading and paving equipment to produce final subgrade and base surfaces meeting the lines, grades and cross sections required by the plans or as directed. When in the judgment of the Engineer the use of such equipment is impractical, this requirement will be waived.

Dampen the surface of the base at the time the concrete is placed. Sprinkle the base when necessary to provide a damp surface. Ensure that no free water or ponding is present at the time of concrete placement. Correct all damaged areas in the subgrade or base before placing concrete.

Do not allow traffic on the underlying asphalt courses other than necessary local traffic and essential construction equipment as authorized by the Engineer.

Unless otherwise approved, use and maintain a braided metal cable stringline reference to control the profile and alignment of the concrete pavement. Monitor the stringline for accuracy and tautness. Set pins at a distance no farther than 50 feet apart. When located on a vertical curve, set pins no farther than 25 feet apart.

700-5 PLACING CONCRETE

(A) General

Use a slip form paver to place concrete except where impractical due to irregular areas or areas of existing pavement adjacent to the proposed pavement.

Place concrete only in the presence of the Engineer or his authorized representative.

Handle concrete so as to prevent segregation and keep free from mud, soil or any other foreign matter.

Where finishing operations must be completed after dark, provide acceptable artificial light in accordance with Section 1413.

Do not pave when any of the following conditions exist:

(1) A descending air temperature at the location of the concrete paving operation and away from artificial heat reaches 35°F. Paving may resume when the weather forecast is projected to reach a high of 40°F on that day's operation and the morning ambient temperature is above 32°F.

(2) The subgrade or base course is frozen.

(3) Aggregates to be used in the mix contain frozen particles.

(4) Air temperature in the shade is 90°F and rising or the concrete temperature is greater than 95°F.

Where additional pavement, aggregate or soil must be placed adjacent to new pavement by machine methods, do not place it until the concrete has attained a compressive strength of at least 3,000 psi.

Construction equipment or hauling equipment will not be allowed over the pavement until the concrete has attained a compressive strength of 3,000 psi.

Spread the concrete uniformly over the entire area without segregation. Perform the spreading with a mechanical spreader independent of the paver except where hand methods are necessary due to pavement design, equipment breakdown or other emergencies.

(B) Slip Form Paver Method

Use a slip form paver that is an approved self-propelled machine designed to spread, consolidate, screed and float finish the concrete in one complete pass of the machine to provide a smooth, dense and homogeneous pavement with minimal hand finishing. Use a slip form paver equipped with forms of sufficient length and rigidity to support the edges of the slab to minimize hand finishing. Use a slip form paver equipped with both horizontal and vertical automatic controls. Operate the paver with continuous forward movement and coordinate all operations of mixing, delivering and spreading the concrete to provide uniform progress and minimize stopping and starting of the paver.

Provide concrete that has sufficient cohesion to prevent appreciable slumping at the edges of each slab. Longitudinal straight edge tolerance of 1/4 inch in 10 feet shall apply to the area within 6 inches of the edge. Edge slump shall be limited to no more than 1/4 inch.

(C) Fixed Form Method

Apply this section to all paving operations where a slip form paver is not being used.

Use forms made of metal and of such section and design that they will adequately support the concrete and the construction equipment.

Use forms that have a depth not less than the edge thickness of the pavement to be constructed and not more than 1 inch greater than the edge thickness of the pavement to be constructed. Use a form which has the base width at least equal to the height of the form.

Use a form in which the top face does not vary from a true plane more than 1/8 inch in 10 feet and the upstanding leg does not vary more than 1/4 inch.

Use straight forms that have at least 3 pin pockets per 10 feet in length and at least 2 pin pockets per 5 feet in length.

Use form pins that are metal and capable of holding the forms rigidly in place during construction operations. The Engineer may require pinholes in the base to be sealed before placing subsequent pavement.

Connect the form sections by a locking joint that will keep the forms free from vertical and horizontal movement.

Use straight forms 10 feet in length on tangents and on curves having a radius of 200 feet or more. For curves having a radius of between 50 feet and 200 feet use either straight forms 5 feet in length or flexible forms. Use flexible forms for curves having a radius of less than 50 feet.

Clean all forms before they are set. Oil all forms before placing concrete. Check the bearing of the forms and correct all areas of inadequate bearing.

Remove all rejected forms immediately from the project.

Set forms a sufficient distance in advance of the point where the concrete is being placed to provide for a continuous operation in placing the concrete and for proper inspection of line and grade.

All forms used for construction joints shall meet this section except provisions shall be made for inserting dowel bars where required.

700-6 VIBRATING CONCRETE

Uniformly vibrate the concrete after it has been spread. Consolidate the full width and depth of the concrete in a single pass.

Vibrators for full width vibration of concrete may be either the surface pan type or the internal type with either immersed tube or multiple spuds. Attach the vibrators to the spreader or the finishing machine, or mount the vibrators on a separate carriage.

Furnish an electronic vibrator monitoring device, displaying the operating frequency of each individual vibrator on the paving equipment. Operate the electronic vibrator monitoring device in areas where the mainline, ramp or loop pavement exceeds 600 feet in length. Record the time, station location, paver track speed and operating frequency of each individual vibrator after every 25 feet of paving or after each 5 minute time interval has elapsed. Provide a report of the vibrator data to the Engineer daily for the first 3 days of paving and weekly thereafter. The Engineer may determine that more frequent submissions are necessary, particularly if equipment is malfunctioning.

Set the internal vibrators to approximately mid slab depth and provide a locking device to avoid contact with any joint, load transfer device, tie bar, subgrade or side form. Provide an operating position locking device so that no part of the vibrating unit can be lowered to the extent that it will come in contact with dowel bars, dowel bar assemblies or tie bars while paving.

Set the horizontal spacing of vibrators to the manufacturer's recommendations, but in no case exceed 16 inches from center to center.

Operate internal and spud vibrators within a frequency range of 3,500 to 8,000 vpm and surface vibrators within a frequency range of 3,500 to 6,500 vpm. Operate vibrators to avoid separation of the mix ingredients. A reduction in vibrator frequency may be required when the forward motion of the paver is reduced to avoid separation of the mix. Either discontinue the use or remove from contact with the concrete, the machine mounted vibrators, whenever the forward motion of the machinery is stopped.

Should the electronic monitoring device fail to operate properly, immediately check the vibrators manually in the presence of the Engineer. If the vibrators are functioning properly, paving may continue. Repair the monitoring device within 3 production days or suspend paving.

700-7 FINISHING

Finish concrete pavement or concrete shoulders in accordance with Article 710-6 or 720-7, respectively. Do not use excessive water for finishing.

700-8 PROTECTION OF PORTLAND CEMENT CONCRETE PAVEMENT

(A) General

Protect the concrete pavement from environmental conditions. Remove and replace concrete pavement damaged as a result of environmental conditions.

Use protective covering that will protect the surface of the freshly placed pavement from rain or cold weather readily available each day at the location of each proposed day's operation before beginning work. Store an adequate quantity of these materials at the paving train.

(B) Cold Weather

When the temperature is projected to drop below 35°F for more than four hours, insulate the concrete pavement to prohibit the concrete surface temperature from dropping below 35°F during the curing period.

(C) Hot Weather

When the anticipated daily high temperature is above 90°F, place the concrete at the coolest temperature practical. Control concrete temperatures to assure proper placing, consolidation, finishing, curing and to prevent plastic shrinkage cracking.

(D) Rain

When rain appears imminent, stop all paving operations, and ensure all available personnel protect the surface of the unhardened concrete. Failure to properly protect the concrete pavement may constitute cause for removal and replacement of the damaged pavement.

700-9 CURING

(A) General

Immediately after finishing operations have been completed and surface water has disappeared, cover all exposed surfaces of the pavement by one of the curing methods herein or as approved by the Engineer.

Apply the selected curing method to the edges of the pavement immediately after the forms are removed.

Curing is required until the concrete compressive strength has exceeded 3,000 psi using the maturity method in accordance with Article 700-13.

(B) Membrane Curing Compound

After final finish and immediately after the free surface moisture has disappeared, use a minimum application rate of 0.0067 gal/sf when the application equipment is mechanically operated. Provide an inline flow-metering device to ensure the proper rate is applied. Apply the curing compound such that puddling or ponding does not occur on the fresh concrete surface.

Use mechanically operated application equipment designed to apply a uniformly agitated continuous flow of the curing compound at the prescribed rate to all concrete surfaces.

Hand spraying shall only be permitted for irregular widths or shapes and surfaces exposed by removal of forms. The rate of application for these areas shall be 0.01 gal/sf.

Do not expose newly placed concrete for more than 30 minutes before being covered with curing compound. Failure to cover the surfaces of the concrete shall be cause for immediate suspension of the paving operation.

Protect the membrane curing compound film at all times during the curing period and repair any damage immediately. Ensure a sufficient amount of polyethylene film, burlap or other approved material is available to provide for protection of the concrete during rain or when the application equipment fails to apply the curing compound uniformly to all surfaces.

Reapply curing compound to any concrete surfaces that received heavy rainfall within 3 hours after initial application.

(C) Polyethylene Film

Spread the sections of the film in a manner that will not damage the finished pavement surface. Securely tape or provide lap joints for the sections that are at least 12 inches wide, and take suitable precautions to prevent the circulation of air beneath the film. Cover all exposed surfaces and beyond the edge of the pavement surface.

Use black or dark plastic sheets when the daily high ambient temperature is between 40°F and 60°F. Use white opaque reflective plastic sheet when the daily ambient temperature is above 60°F. Plastic sheets will meet ASTM C171.

Check the film for damage when it is spread and during the curing period. Repair or replace any damaged sections immediately.

(D) Burlap

Spread the sections of burlap in a manner that will not damage the finished pavement surface. Provide lap joints that are at least 6 inches wide.

Use an amount of burlap that is not less than 12 ounces per running yard based on a 40 inch width. Use either one layer of Class 4 burlap or 2 layers of Class 1, 2 or 3 burlap.

Saturate the burlap thoroughly before placing on the concrete and keep thoroughly wet throughout the curing period.

700-10 REMOVING FORMS

Do not remove forms from freshly placed concrete for at least 12 hours after placement and until the concrete has hardened sufficiently to resist spalling, cracking or any other damage. Repair any honeycombed areas along the sides or edges of the slab by filling with mortar immediately after the forms have been removed. Use mortar consisting of one part cement to 2 parts fine aggregate.

700-11 JOINT CONSTRUCTION

(A) General

Construct all joints in accordance with these *Standard Specifications* and the details shown on the plans. Saw all transverse joints and seal them with joint sealer in accordance with the dimensions and details shown in the contract. Seal joints in accordance with Article 700-12.

Saw the concrete pavement as soon as it can support the weight of the equipment and operator without disturbing the final finish. Saw joints in a neat, vertical straight line without chipping, spalling, tearing or disturbing the final finish.

Ensure an adequate amount of sawing equipment is available to match the production and concrete paving operations. At least one standby sawing unit is recommended. Construct the joint groove using a 1/8 inch saw blade to a minimum depth of 4 inches or the design thickness divided by 3 whichever is less. Perform sawing as soon as the concrete has hardened sufficiently without undercutting, spalling and raveling to control random cracking. To estimate the time of sawing, it is recommended to use the latest version of FHWA's High Performance Paving software entitled HIPERPAV.

Immediately after sawing the joint to the dimensions shown on the plans, completely remove the resulting slurry from the joint without damaging the adjacent concrete. Immediately reapply curing membrane to areas damaged by the sawing operation.

Deviations from the method of joint construction specified in the contract requires prior approval in writing. Such approval is conditional and is subject to obtaining satisfactory results.

The Engineer may order any concrete pavement or shoulder where uncontrolled cracking has occurred before final acceptance to be removed and replaced at no cost to the Department. Where permitted, the Contractor may be allowed to repair the cracking in a manner acceptable to the Engineer.

Before placing either concrete pavement or concrete shoulders adjacent to a previously placed pavement, cover the transverse joint opening on the edge of the existing slab to prevent intrusion of grout into the opening.

(B) Transverse Contraction Joints

Construct transverse contraction joints in accordance with the details, dimensions and intervals as shown on the plans.

(C) Longitudinal Contraction Joints

Construct longitudinal contraction joints in all pavements wider than 16 feet in accordance with the details and dimensions shown on the plans.

(D) Transverse Construction Joints

(1) General

Construct transverse construction joints by use of an approved form at the end of each day's operations (planned joint) or whenever the placing of concrete is suspended for more than 30 minutes (emergency joint).

(2) Planned Transverse Construction Joints

Locate this type of joint at the same spacing required for contraction joints. Use dowel bars of the size and spacing shown on the plans.

(3) Emergency Transverse Construction Joints

Use this type of joint when the placing of concrete is suspended for more than 30 minutes. Use tie bars of the size and spacing shown on the plans.

Do not change the spacing of contraction joints due to emergency construction joints. Locate the emergency construction joints at least 6 feet from any contraction joint or planned construction joint.

(E) Longitudinal Construction Joints

Construct longitudinal construction joints using tie bars in accordance with the details shown on the plans.

(F) Transverse Expansion Joints

Construct transverse expansion joints in accordance with the details shown on the plans utilizing an approved joint assembly.

(G) Verification of Dowel Bar Alignment

Use either properly secured dowel baskets or a dowel bar inserter, provided the ability to correctly locate and align the dowels at the joints is demonstrated as described below.

Provide a calibrated magnetic imaging device that will document dowel bar location and alignment. Calibrate the magnetic imaging device to the type and size dowel bar used in the work. Use this device as a process control and make necessary adjustment to ensure the dowels are placed in the correct location.

Scan at least 25% of the joints in the initial placement or 1.0 mile of pavement, whichever is greater, at random intervals, as selected by the Engineer, throughout the pavement each time the paving train is mobilized. Mark scanned joints on the pavement.

Scan all joints in this initial placement if the dowel bars exhibit longitudinal translation (side shift), horizontal translation, vertical translation (depth), horizontal skew or vertical tilt, above the allowable tolerances defined below. In addition, continue scanning no less than 25% of the joints until it is established that the dowel bar inserter or secured dowel basket assemblies are consistently placing the dowel bars at the correct location and meeting the tolerances defined in Table 700-1. Once the engineer determines that consistency is established, the contractor may reduce the percentage of scanned joints to no less than 10%. Any time inconsistency in the placement of the dowel bars becomes evident, additional scanning may be required up to 100% of the joints. Materials and Tests Unit will provide Quality Assurance and random verification scans during the initial concrete placement to verify the Contractor’s scan results. The QA frequency will be at least 10% of the Contractor’s scan.

If consistency of the proper dowel bar alignment cannot be established within a reasonable time frame, the Engineer will have the option of suspending the paving operation.

Provide a report of the scanned joints within 48 hours of completing the day's production. The report should include the station and lane of the joint scanned, as well as the horizontal location, depth, longitudinal translation (side shift), horizontal skew and vertical tilt, and total misalignment, of each dowel bar in the joint. If a dowel bar inserter is used, the joint score described below should also be provided in the report.

Longitudinal translation (side shift) is defined as the position of the center of the dowel bar in relation to the sawed joint. The maximum allowable longitudinal translation (side shift) is 2 inches.

Horizontal translation is defined as difference in the actual dowel bar location from its theoretical position as detailed in the standard details. The maximum allowable horizontal translation is 2 inches.

Vertical translation (depth) is the difference in the actual dowel bar location from the theoretical midpoint of the slab. The maximum allowable vertical translation is 1/2 inch higher than the theoretical midpoint and 1inch lower than the theoretical midpoint.

Dowel bar misalignment, either vertical tilt or horizontal skew is defined as the difference in position of the dowel bar ends with respect to each other. Vertical tilt is measured in the vertical axis whereas horizontal skew is measured in the horizontal axis.

If a dowel bar inserter is used, determine a joint score for each joint scanned. The joint score is a measure of the combined effects from the dowel's horizontal skew or vertical tilt. The joint score is determined by summing the product of the weight shown in the Table 700-1 and the number of bars in each misalignment category and adding one. The vertical tilt and horizontal skew should be evaluated and the total misalignment shall be used in determining the joint score.

TABLE 700-1
TOLERANCE FOR DOWEL BAR ALIGNMENT[A]

Misalignment Category, inches (mm)	Weight
$0 \leq \mathbf{d} \leq 0.6\ (15)$	0
$0.6\ (15) < \mathbf{d} \leq 0.8\ (20)$	2
$0.8\ (20) < \mathbf{d} \leq 1.00\ (25)$	4
$1.00\ (25) < \mathbf{d} \leq 1.50\ (38)$	5
$1.50\ (38) \leq \mathbf{d}$	10

A. Where **d** is the individual dowel bar misalignment.

A joint that has a joint score of 12 or greater will be considered locked.

When a locked joint as defined above is discovered, scan the 2 joints immediately adjacent to the locked joint. If either of the adjacent joints are deemed to be locked, provide a written proposal to address the dowel misalignment for each locked joint. No corrective action should be performed without written approval.

700-12 SEALING JOINTS

(A) General

Seal all joints with an approved low modulus silicone sealant in the presence of the Engineer.

Install backer rod and sealant in accordance with the details shown in the plans and the manufacturer's recommendations.

Any failure of the joint material will be cause for rejection. Repair the failed joint material as approved by the Engineer.

When requested, have a representative of the silicone sealant manufacturer present on the project during the sealing operation.

(B) Age of Pavement

Do not seal the joints until the concrete is at least 7 calendar days old and concrete is dry based on sealant manufacturer's recommendations.

Do not perform final sawing and sealing of concrete pavement joints until after surface testing, correction of surface deficiencies and all adjacent earth and paved shoulder construction has been completed.

(C) Temperature

Do not place joint sealant when the air temperature near the joint is less than 45°F or is 45°F and falling.

(D) Sealing the Joint

Immediately after sawing the joint to the dimensions as shown on the plans, completely remove the resulting slurry from the joint by flushing with a jet of water under pressure. Use sand blasting to clean joint faces before applying sealant. Make as many passes with a sand blaster as are necessary to provide a clean joint wall.

Blow all joints clear of deleterious materials with air using a nozzle pressure of at least 90 psi before installing the backer rod. Use rotary screw compressors for this purpose that are equipped with traps capable of removing water and oil from the air. Maintain the traps in accordance with manufacturer's instructions.

Apply sealer only on thoroughly clean and dry joints. Place the sealer to closely conform to dimensions shown on the plans. Any unreasonable deviation will be cause for rejection.

(E) Cleaning Pavement

After a joint has been sealed, remove surplus joint sealer on the pavement as soon as possible.

700-13 USE OF NEW PAVEMENT OR SHOULDER

Traffic or other heavy equipment will not be allowed on the concrete pavement or shoulder until the estimated compressive strength of the concrete using the maturity method has exceeded 3,000 psi. Estimate the compressive strength of concrete pavement in accordance with ASTM C1074 unless otherwise specified.

Furnish thermocouples or thermistors and digital data logging maturity meters that automatically compute and display the maturity index in terms of a temperature-time factor (TTF). The maturity meters must be capable of storing at least 28 days worth of data and exporting data into an Excel® spreadsheet. Install loggers in slabs after every 2 lots approximately 4 inches from the concrete surface. Submit the proposed equipment to the Engineer for approval.

When establishing a strength-maturity relationship, perform compressive tests at ages 1, 3, 7, 14 and 28 days in accordance with AASHTO T 22.

Use the TTF maturity function to compute the maturity index from the measured temperature history of the concrete. Set the datum temperature at -10°C to calculate the TTF in Equation 1 of ASTM C1074.

Establish and submit a strength-maturity relationship in conjunction with each concrete pavement mix design. Determine the TTF corresponding to the strength-maturity relationship at 3,500 psi, TTF. Any changes to plant operations, material sources or mix proportions will affect the strength-maturity relationship. If any changes occur during production, develop a new strength-maturity relationship unless otherwise directed.

Validate the strength-maturity relationship and the correlation between cylinders and beams during the first day's production by casting cylinders and beams and performing strength tests. Use the TTF developed during the mix design process to verify the strength-maturity relationship.

Validate the strength-maturity relationship and the correlation between cylinders and beams by casting cylinders and beams and performing strength tests at least every 30 calendar days, or when the TTF varies by more than 10% from the latest approved maturity curve or there is a material change from the approved concrete mix design. If the verification sample's compressive strength when tested at TTF is less than 3,000 psi, immediately suspend early opening of traffic on pavement that has not obtained TTF until a new strength-maturity relationship is developed.

No permanent traffic will be allowed on the pavement until construction of the joints, including all sawing, sealing and curing that is required, has been completed.

Take particular care to protect the exposed pavement edges and ends.

700-14 CONTRACTOR'S RESPONSIBILITY FOR PROCESS CONTROL

Perform process control sampling and testing of concrete materials and operations in accordance with Article 1000-3. The Contractor's roadway foreman and all personnel involved in the batching, sampling, testing and acceptance of Portland cement concrete pavement shall be Department certified Portland cement concrete pavement technicians.

700-15 ACCEPTANCE TESTS FOR CONCRETE

(A) Responsibility

The Engineer will conduct acceptance sampling and testing of concrete. Provide access to all materials to be sampled and tested. The following tests will be performed on both concrete pavement and concrete shoulders to determine acceptance.

(B) Lot Definition

A lot for acceptance purposes is defined and described in Article 710-4.

(C) Air Content

The air content of the concrete will be determined on the roadway at a frequency established by the Engineer and in accordance with Subarticle 1000-3(B). The sample taken for determination of air content will be obtained immediately after the concrete has been discharged on the road.

Concrete failing to meet specification requirements for air content will be subject to rejection.

(D) Slump

The slump of the concrete will be determined in accordance with AASHTO T 119 at a frequency established by the Engineer. The sample taken for determination of slump will be obtained immediately after the concrete has been discharged on the road.

When the slump of the concrete is questionable by visual observation, do not place the concrete on the road until tested for slump by the Engineer.

Concrete failing to meet specification requirements for slump will be subject to rejection.

(E) Compressive Strength

Determine the compressive strength of concrete using one set of two 6 inch x 12 inch cylinders at 28 calendar days. Test samples will be made by the Engineer from the concrete as it comes from the mixer. The samples will be made and cured in accordance with AASHTO T 23. Test specimens will be tested by the Engineer in accordance with AASHTO T 22. Furnish curing facilities for the test samples in accordance with Section 725.

(F) Thickness

The thickness of the pavement will be determined by measurement of cores in accordance with AASHTO T 148.

Take 4 inch diameter cores in the presence of the Engineer. The Engineer will take immediate possession of the cores. Take the cores when the concrete has attained a compressive strength of at least 3,500 psi and at least 72 hours have elapsed since placement of the pavement. If the concrete has not attained a compressive strength of at least 3,500 psi, the gross vehicle weight rating of vehicles supporting the coring operation may not exceed 7,000 lbs. Take cores no later than 30 days after the pavement has been placed. The core locations for each lot will be selected at random by the Engineer.

Patch all core holes within 72 hours of taking the core, using an approved nonshrink grout compatible with the pavement or shoulder concrete.

(G) Surface Smoothness

Perform acceptance testing for surface smoothness on concrete pavements in accordance with Article 710-7. The Engineer will have a representative present during all testing and will take possession of the results at the completion of each day's testing.

700-16 MEASUREMENT AND PAYMENT

Remove and repair defects and damage to underlying asphalt course, Portland cement concrete and joints at no cost to the Department.

SECTION 710
CONCRETE PAVEMENT

710-1 DESCRIPTION

Perform the work covered by this section, including, but not limited to, designing the concrete mix; furnishing and placing concrete; furnishing of all admixtures and additives; constructing all joints and furnishing joint materials; marking the pavement; curing the pavement and furnishing all curing materials; furnishing concrete necessary for making test beams and cylinders; performing maturity testing; coring and patching the pavement; calibrating and checking the operation of batching equipment; taking actions necessary to prevent or to repair cracking; sawing and sealing joints; verifying dowel bar alignment; removing and replacing of defective pavement; and constructing Portland cement concrete pavement in accordance with these *Standard Specifications* and with the lines, grades and dimensions shown on the plans.