

ARTICLE 14

PORTLAND CEMENT CONCRETE PAVEMENT

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Section	14.01	<u>GENERAL</u>
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Rigid pavement consists of constructing a specified Portland Cement Concrete Paving on a prepared subgrade. The utilities and other items in and beneath the street must be properly coordinated with the construction of rigid pavement to avoid all conflicts. The work to be done shall include the furnishing of all supervision, labor, materials, equipment and incidentals necessary for the proposed rigid pavement construction in accordance with the approved Drawings and specifications.

All rigid pavement installed will comply with the FDOT Standard Specifications for the Road and Bridge Construction, most current edition.

Section	14.02	<u>SUBGRADE PREPARATION FOR RIGID PAVEMENT</u>
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	14.02.01	<u>General</u>
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The bottom of the excavation for the pavement or top of the earth fill will be known as the pavement subgrade and shall conform to the lines, grade and cross sections shown on the plans.

Prior to placing the concrete, the subgrade shall be tested for conformity with the cross section shown on the plans. If necessary, material shall be removed or added as required to bring all portions of the subgrade to the correct elevation. Concrete shall not be placed on any portion of the subgrade which has not been tested for correct elevation. The subgrade shall be cleared of all debris, including tree roots, stumps, and loose material. If at any time trucks, construction equipment or slip forming machines cause rutting or displacement of the subgrade materials, the subgrade shall be reshaped and compacted. The subgrade shall be in a moist condition at the time the concrete is placed.

14.02.02 Subgrade Material

The top 6 inches shall be composed of well drained granular soils that are predominantly sandy, mixed with no more silt or clay than required to obtain a Florida bearing value of 50 plus or minus 5 and be compacted to a minimum density of 98% of maximum density in accordance with AASHTO T-180.

Section **14.03** **MATERIALS, PROPORTIONING AND CONSTRUCTION FOR RIGID PAVEMENTS**

The materials and proportioning shall be in accordance with ACI Standard 318, latest edition. All construction procedures shall be in accordance with FDOT Standard Specifications for Road and Bridge Construction, latest edition.

14.03.01 Strength Required

All concrete shall have a minimum compressive strength of 3,000 psi at 28 days. Conformance to strength requirements shall be determined by ACI Standard 318, latest edition.

14.03.02 Slump

The mixture shall contain no more water than is necessary to produce concrete which is workable and plastic. The minimum slump necessary to place the concrete satisfactorily shall be used. Slumps shall be maintained so as not to exceed 4½ inches for non-vibrated placement nor to exceed 5 inches for vibrated placement.

The design mix shall be submitted to the City Engineer and Construction Manager for approval prior to paving.

Section **14.04** **EQUIPMENT**

14.04.01 Forms

The pavement shall be placed to lines and grades established by the Engineer. The edges of pavement shall be vertical to the subgrade and forms shall be sufficient to support mechanical equipment.

14.04.02 Ready Mixed Plants

The plant shall be in accordance with the FDOT Standard Specifications for Road and Bridge Construction, latest edition. All plants must be DOT certified or approved by the City Engineer.

14.04.03 On-Site Central Mix Plants

The plant shall be in accordance with the FDOT Standard Specifications for Road and Bridge Construction, latest edition. The trucks used to transport the concrete shall be so constructed to prohibit segregation of the mix. All plants must be DOT certified or approved by the City Engineer.

14.04.04 Paver

All equipment used in the placement of concrete pavements shall conform to FDOT Standard Specifications for Road and Bridge Construction, latest edition.

Section 14.05 MIXING AND PLACING FOR RIGID PAVEMENT

14.05.01 General

Concrete pavement shall be constructed on the prepared subgrade in accordance with these Regulations and in conformity with the lines, grades, thickness, and typical cross sections shown on the construction plans. Concrete pavement shall meet the following Minimum thickness requirements.

Minimum Type of Development	Roadway Classification	Concrete Thickness
Residential	Marginal Access and Parking Areas	6"
	Local Street	8"
	Minor Collector Street	8"
	Major Collector Street	8"
Industrial and Commercial	Marginal Access and Parking Areas	6"
	Minor Street	8"
	Collector Street	8"

14.05.02 Transporting Concrete

Concrete may be transported any distance providing it is discharged on the grade with the slump within the required slump range and meets concrete time limit requirements. If additional water is required to maintain the specified slump of concrete transported in the truck mixers, it may be added with the permission of the City Engineer or his Designee. In this case, a minimum of 25 additional revolutions of the mixer drum at designed mixing speed shall be required before discharging of the concrete. All concrete deliveries shall be accompanied by a batch time stamped on the delivery ticket by means of a mechanical time clock. Batch time shall be an accurate time of concrete batch and delivery truck departure from the batch plant.

14.05.03 Concrete Time Limit

The length of time that the concrete can be held in the truck shall conform to the following:

- A) Air temperature 45°F to 80°F, 90 minutes.
- B) Air temperature over 80°F with a retarder added to the mix, 90 minutes maximum.
- C) Air temperature over 80°F without a retarder added to the mix, 60 minutes maximum.
- D) The maximum temperature of the concrete at the time of placing shall be 95°F.

14.05.04 Placing Concrete

The concrete shall be deposited on the grade in such a manner as to require as little re-handling as possible. It shall be deposited in successive batches in a continuous operation. The concrete shall be consolidated by suitable means so as to preclude the formation of voids or honeycomb pockets.

14.05.05 Placing in Cold Weather

Concrete shall only be placed when the temperature is at least 40°F and rising. Any concrete damaged by frost action shall be removed and replaced.

Section 14.06 FINISHING

14.06.01 General

The concrete shall be struck-off, consolidated, and finished with mechanical equipment in such a manner that after final finishing, it shall conform to the pavement cross section shown on the construction plans. Hand finishing shall be permitted in narrow widths, in areas of irregular dimensions, or in the event of breakdown of the mechanical equipment, only to finish the concrete already deposited on the grade.

14.06.02 Final Surface Finish

The final surface of the pavement shall have uniform, skid-resistant texture. The method of texturing shall be approved by the City Engineer or his Designee and may require change in the final finishing procedure as required to produce the desired final surface texture. A burlap drag or transverse broom finish is recommended for local and collector streets. Arterial and rural roads may require an overlapping stiff bristled broom or steel comb finish at the discretion of the City Engineer or his Designee.

14.06.03 Pavement Exposed to Rain During Construction

The Contractor shall always have materials available to protect the surface of the plastic concrete against rain. Areas of the pavement surface that exhibit a smooth, sandy appearance after the rain ceases shall be textured before applying the membrane curing materials. Areas that have suffered surface erosion and have coarse aggregate exposed, and have not yet hardened, shall be reworked by hand methods or with the finishing machine when the form paving method is used. Fresh concrete containing the same materials and properties as the pavement concrete shall be added to maintain an adequate supply in front of the screeds or machine to assure replacement of the concrete eroded from the surface. The surface shall then be textured and cured as specified.

If pavement edges have been severely eroded and the concrete has not set, the edges shall be repaired by setting side forms and replacing eroded concrete. After the side forms are set, fresh concrete shall be placed and finished prior to texturing and curing. After the pavement has hardened, remedial work shall not be permitted until after the curing period has terminated.

Section 14.07 CURING FOR RIGID PAVEMENTS

14.07.01 General

After finishing operations have been completed and immediately after the free water has left the surface, the surface of the slab and the sides of the slab, for slip formed pavement, shall be coated and sealed with a uniform layer of membrane curing compound. The curing compound shall be applied at the rate of not less than 1 gallon per 200 square feet of surface. When the forms are removed, curing compound shall be applied to the sides of the slab. Areas in which the curing membrane is damaged shall be re-sprayed with curing compound within a period of 3 days.

Curing compound may be omitted when, in conjunction with protection of pavement from inclement weather, a polyethylene film or other acceptable material is applied over the pavement and maintained intact for 3 days.

14.07.02 Cracks

Concrete rigid pavement shall not be accepted with excessive uncontrolled cracks. Shrinkage cracks must be avoided.

Uncontrolled cracks 1/16 inch or larger in width shall be repaired. One of the following repair methods shall be used:

- A) Remove and Replacement.
- B) Widen with power router and fill with an approved joint sealant.
- C) Epoxy grout injection.

The City Engineer or his Designee shall determine which cracks are to be repaired and the method to be used.

Section 14.08 JOINTS IN RIGID PAVEMENTS

14.08.01 General

Transverse and longitudinal joints shall be constructed to a maximum spacing of 15 feet. Transverse joints shall extend the entire width of the pavement and through the curbs.

Sawing of joints shall begin 4 to 6 hours after placing concrete or as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling and before uncontrolled cracking occurs. If necessary, the sawing operations shall be carried on both day and night, regardless of weather conditions.

14.08.02 Construction Joints

Longitudinal joints may be construction joints at the discretion of the City Engineer or his Designee. Transverse construction joints shall be installed whenever the placing of concrete is suspended a sufficient length of time for the concrete to begin to harden.

14.08.03 Joint Sealing

Joints shall be sealed, if required, before the pavement is exposed to traffic, including construction traffic. Prior to sealing, all foreign material shall be removed from the joints and the joints shall be thoroughly dry.

Section 14.09 FINAL ACCEPTANCE FOR RIGID PAVEMENTS

14.09.01 General Acceptance for Rigid Pavements

Before the pavement shall be considered for acceptance, all items shall be complete in accordance with the construction plans and these Regulations. Equipment, surplus materials, and construction debris shall be removed from the project.

14.09.02 Opening to Traffic

The pavement shall be closed to traffic after the concrete is placed until it reaches a compressive strength of 3,000 psi under ordinary field conditions. This does not include the sawing and sealing equipment or other light miscellaneous equipment. New roadways shall be closed to public traffic until approved by the City Engineer or his Designee.

14.09.03 Testing of Concrete

Concrete pavement shall have a 28-day compressive strength of 3,000 psi. Portland Cement Concrete control for slump testing, and concrete cylinder samples and testing is required and shall be in accordance with AASHTO and ASTM Specifications, latest editions. Test reports shall be submitted to the City Engineer or his Designee by the Engineer of Record for review of all non-public improvements. All tests on public improvements shall be conducted by a Geotechnical/Soils Engineer under contract to the City. Final acceptance shall be based on testing in accordance with other paving requirements. Failed tests or additional tests are at Contractor's expense.