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# 1 Portland Cement Concrete Pavement

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## Description

### Types of Concrete Pavement

*Plain Concrete Pavement*

*Plain Concrete Pavement with Joints*

*Reinforced Concrete Pavement with Joints*

*Continuously Reinforced Concrete Pavement*

*Cement Concrete Bridge Approach Pavement*

# **CHAPTER ONE:**

## ***PORTLAND CEMENT CONCRETE PAVEMENT***

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The pavement is the portion of the road that vehicles come in direct contact with. A rough riding pot-holed pavement is hard on vehicles and uncomfortable to the motorist. For these and many other reasons, a structurally sound, smooth riding, and long lasting pavement is very important.

A quality pavement requires materials and construction practices in accordance with the design and specifications for the pavement. Those responsible for this quality are required to know how the pavement is built, the design and specifications requirements, and how to check for compliance of the design and specifications.

There are several types of concrete pavements and requirements for their corresponding contraction joints. This chapter discusses the different types of concrete pavements and the location where to find the requirements for the pavements in the contract documents.

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### **DESCRIPTION**

PCCP is composed of Portland cement concrete and, when specified, reinforcing steel and various joint materials. Concrete pavement is placed at the thickness specified in the plans or proposal and is constructed on a prepared subgrade or base course. The pavement is placed in reasonably close conformance to the lines, grades, and typical cross-sections (Figure 1-1) shown in the plans.

Concrete basically consists of Portland cement, water, and fine and coarse aggregates. The curing of the concrete is a chemical reaction of the Portland cement and water, which causes the concrete to shrink and crack. To control the cracking, transverse joints and longitudinal joints are constructed in the pavement. All pavements require transverse joints to control transverse cracking. These are sometimes known as contraction joints. Pavements wider than 16 feet require longitudinal joints to control longitudinal cracking. Pavements with transverse joints are referred to as pavements with joints or jointed pavements.

# TYPICAL CROSS-SECTIONS

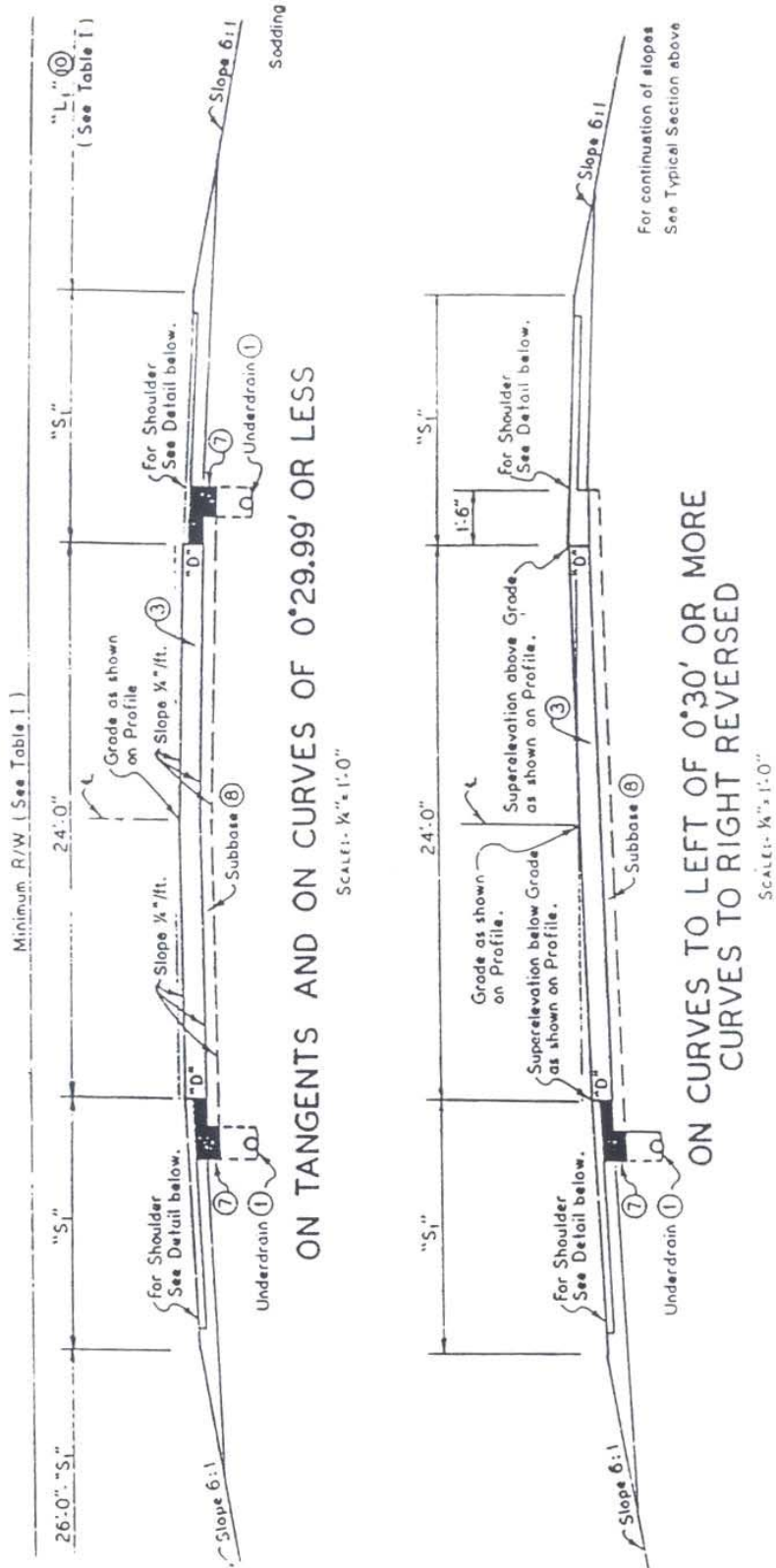
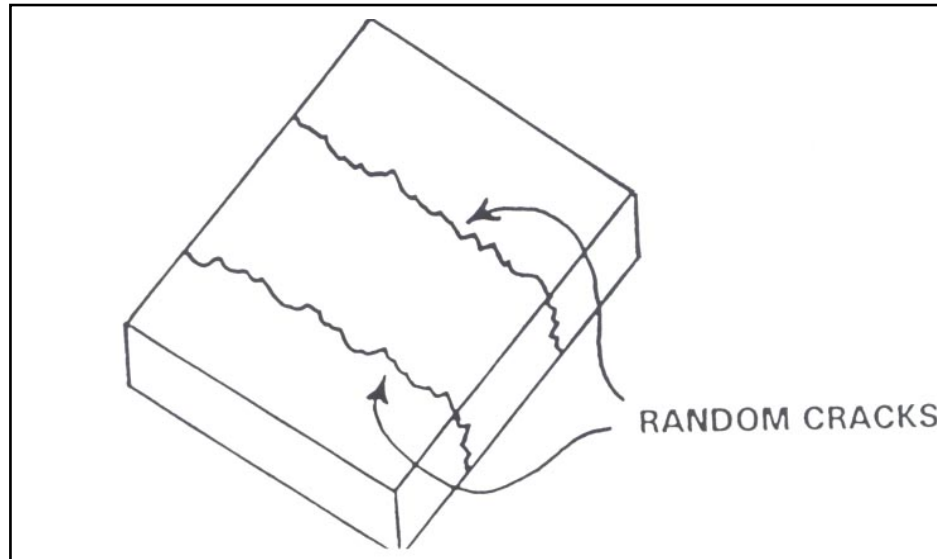


Figure 1-1. Typical Cross Sections

## TYPES OF CONCRETE PAVEMENT

### *PLAIN CONCRETE PAVEMENT*

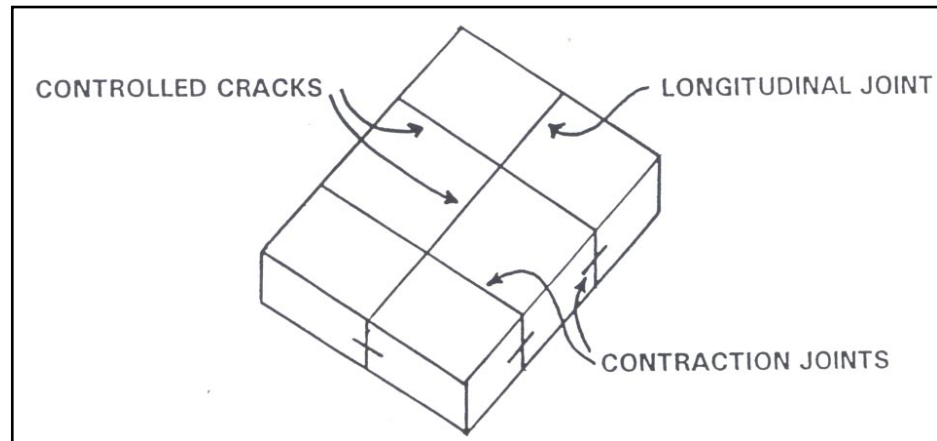
Plain concrete pavement is constructed of only concrete with no reinforcement or joints and is used mainly for base widening of an existing pavement. This pavement is used in conjunction with a Hot Mix Asphalt (HMA) overlay. Uncontrolled random cracking as shown in Figure 1-2, occurs in this type of pavement.



**Figure 1-2. Random Cracks**

### *PLAIN CONCRETE PAVEMENT WITH JOINTS*

Plain concrete pavement with joints has no reinforcing steel but is constructed with various transverse joint spacing (joints from edge of pavement to edge of pavement). The types of joints used in plain concrete are shown in Figure 1-3. Nearly all of the concrete pavements constructed by INDOT are of this type.



**Figure 1-3. PCCP Joints**

***REINFORCED CONCRETE PAVEMENT WITH JOINTS***

Reinforced concrete pavement with joints is pavement reinforced with steel mesh and is built with transverse joint spacing of 40 ft. This type of pavement was the main type of concrete pavement built by INDOT until just a few years ago.

***CONTINUOUSLY REINFORCED CONCRETE PAVEMENT***

Continuously reinforced concrete (CRC) pavement is reinforced with a large amount of longitudinal steel (No. 5 bars, 6 inches on center) and only longitudinal joints as required. There are no transverse joints in this type of pavement. INDOT no longer builds CRC pavements.

***CEMENT CONCRETE BRIDGE APPROACH PAVEMENT***

Cement concrete bridge approaches are built at the ends of a bridge with a minimum length of 20 ft. They are generally reinforced with two layers of steel and are built to a specified thickness. The purpose of a bridge approach is to eliminate as much as possible the settlement of the pavement at the bridge ends. Since the bridge end bents are usually on piles, the bridge does not settle; however, the subgrade at the bridge does settle.