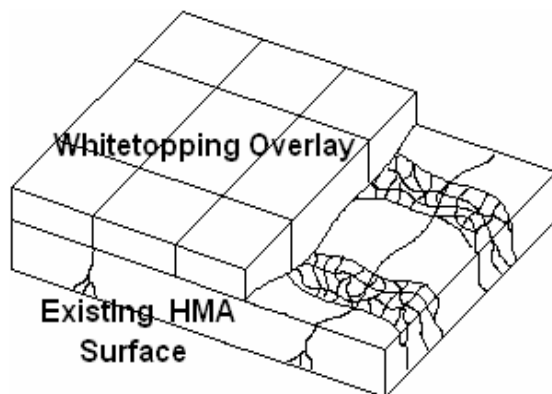


**PAVEMENT TECHNOLOGY ADVISORY  
- WHITETOPPING -  
PTA-M4**

**WHAT IS WHITETOPPING?**

Whitetopping consists of a concrete overlay, or inlay, placed on an existing hot-mix asphalt (HMA) surfaced pavement, as shown in Figure 1:



**Figure 1: Whitetopping Overlay**

Two types of whitetopping overlays are available: *thin whitetopping* is between 4-inches and 7-inches thick, and *ultra-thin whitetopping* is between 2-inches and 4-inches thick. For practical purposes, a concrete overlay more than 7-inches thick constructed on an existing HMA-surfaced pavement is considered to be an unbonded concrete overlay, not whitetopping (see [PTA-M2](#)).

Whitetopping can restore the ride quality of HMA surfaced pavements and alleviate many HMA pavement distresses. Whitetopping can be particularly useful at high traffic intersections, bus stops, or other locations prone to HMA mix displacement.

**STATUS IN ILLINOIS**

Between 1998 and 2001, six experimental whitetopping overlays were constructed as part of a study by the Bureau of Materials and Physical Research (BMPR). Four of the six were thin whitetopping projects placed on mainline pavements, and the remaining two were ultra-thin whitetopping projects placed at intersections. The early performance of each pavement is documented in Illinois Department of Transportation (IDOT) [Physical Research Report No.144](#).

Performance of the thin whitetopping projects has been excellent to date, and performance of the ultra-thin projects is considered good to fair. Mid-panel and corner cracking of the overlay panels, as well as shifting and spalling of the saw joints, caused the reduced performance rating for the ultra-thin projects.

Additional whitetopping projects not included in the study were constructed at intersections in Harrisburg, Anna, and Marion. Similar performance to the study projects has been observed at those locations.

**THICKNESS DESIGN**

The American Concrete Pavement Association (ACPA) has published a procedure for determining an adequate whitetopping overlay thickness. This procedure requires inputs of subgrade strength, supporting strength of the existing pavement, flexural strength of

the concrete overlay, design period, and design traffic. IDOT has not adopted a standard design procedure for developing whitetopping overlay thicknesses. BMPR can be contacted for assistance in developing a whitetopping thickness design.

### **CONSTRUCTION**

Whitetopping utilizes existing pavement construction equipment and practices; however, extra care is required for surface preparation prior to placement. Milling or scarifying the existing HMA surface for improved bonding is very important. After milling or scarifying, the pavement to be overlaid should be cleaned thoroughly and covered until the concrete is ready to be placed. When ambient temperatures are greater than 90°F, water fogging of the prepared surface immediately before placing the whitetopping is recommended. No standing water is allowed.

Placement of the whitetopping overlay is similar to new concrete construction, with continuous placement of the concrete recommended throughout each pour. Once the newly placed concrete can support a lightweight saw and operator, partial-depth saw cuts are made at locations of underlying joints, patch edges, and working cracks. This operation results in large panels of varied dimension. Additional partial-depth cuts are made to create smaller, nearly square panels. Final panel dimensions on each side should measure (in feet) about 1 to 1.5 times the thickness of the overlay (in inches). After curing, the initial partial-depth saw cuts at patches, cracks, and joints are sawed full-depth and sealed.

### **SPECIAL CONSIDERATIONS**

Whitetopping overlays are not suitable for every location. Sections that result in "hybrid" overlays [thin whitetopping adjoining a thin bonded concrete overlay (see [PTA-M3](#))] are strongly discouraged.

Other considerations include the thickness and condition of the existing HMA surface. Whitetopping should be placed on a minimum HMA thickness of 4 inches to provide a sufficient base for the overlay. If milling is performed, at least 4 inches of HMA should remain in place, or new material placed to meet the 4-inch requirement. Severely dis-tressed areas of the existing pavement should be repaired prior to whitetopping. Some areas may require removal and replacement.

Plastic shrinkage cracking, resulting from rapid water evaporation in the fresh concrete, can occur within hours after placement. Ultra-thin whitetopping is especially vulnerable. Some measures can be taken to minimize plastic shrinkage cracking, including: water fogging of the fresh concrete surface immediately after finishing; applying curing compound as soon as possible; and covering the new concrete with wet burlap and plastic immediately after initial saw cutting. Adding polypropylene fibers at a rate of 2 to 3 pounds per cubic yard of concrete can also be effective.

### **PROJECT DEVELOPMENT**

Approval for whitetopping must be obtained from the Central Bureau of Design and Environment, and an experimental features work plan filed with BMPR. Whitetopping is not allowed on the interstate system in Illinois. BMPR should be contacted for assistance in project selection, as well as to review whitetopping thickness designs.

If you have any questions regarding whitetopping, please contact:

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