ULTRA-THIN BONDED WEARING COURSE

A thin, gap-graded polymer-modified hot mix and emulsion membrane, placed with special equipment.

An Ultra-Thin Bonded Wearing Course (UTBWC) is a multi-layer system that is placed in a single pass. An emulsion layer is placed first to bond the old and new materials, and then a thin layer of gap-graded hot mix is immediately placed on the emulsion membrane. The process is completed in one pass with specialized equipment, and results in a driving surface that looks much like a traditional hot mix wearing course. It can be opened to traffic within 20 to 30 minutes. UTBWC can be used to address mild to moderate cracking, but should not be expected to correct severe cracking and rutting or base failures.

Selecting the Project: UTBWC is high-performance surface treatment and an excellent preservation tool that is appropriate for addressing mild to moderate distresses and surface deficiencies. It reduces noise and can improve safety by reducing splash and spray during rain events. The emulsion bonding layer helps to prevent delamination and slow the recurrence of reflective cracking.

PURPOSES:

Waterproof the surface
Seal moderate cracks
Correct surface irregularities
Add skid resistance
Reduce splash and spray
Repair raveling / minor rutting
Slow reflective cracking

CAUTION: *UTBWC may not effectively mask significant areas of unevenness, and should not be used to address rutting of > ½". Cracks should be filled and localized structural failures should be addressed prior to the application of UTBWC.*

Materials: UTBWC mixtures utilize an emulsion membrane to prevent water intrusion and as a bonding layer to prevent delamination. The membrane is followed by a gap-graded hot mix layer. Both the emulsion and binder in the hot mix are usually polymer-modified. **Aggregates** as large as ½" may be selected, as appropriate for a wearing course. To ensure quality, all materials should come from an approved source.

Equipment: Special equipment (**spray paver**) is necessary to place the emulsion membrane and hot mix asphalt layer in a single pass. A **static steel-drum roller** is needed to ensure proper embedment of aggregates in the membrane and create a smooth surface.

Construction: Place during dry, **warm** conditions when no rains or high winds are forecasted *(minimum surface temperature of 60°F)* and no freezing conditions are anticipated in the first 24 hours. The surface must be clean. **Consistency** in the paving process is critical, as the emulsion must be continuous and provide complete coverage. The lift thickness is typically 1.5 to 2 times the largest aggregate size. Rolling is intended to seat the aggregates firmly in the membrane and smooth the surface (rather than for compaction), and should be done with a static steel drum roller using 1 to 2 passes. Traffic can be allowed on the surface after the mix has cooled to approximately 150°F.

Cost:
$5 - $7 / sy
$35,000 - $50,000 / lane-mile

If the surface is not swept clean prior to placement of the membrane, the bond will not form properly, causing the mix to ravel and delaminate prematurely. If the surface is not uniform or exhibits a washboarding effect, ensure the mix is not segregated, and slow down the roller operation.

PAVEMENT LIFE EXTENSION GENERATED BY UTBWC	LOWER TRAFFIC	HIGHER TRAFFIC
Asphalt surface – 3 to 5 yrs old, good/fair condition	10 – 12 yrs	8 – 10 yrs
Asphalt surface – aged, fair condition	7 – 10 yrs	6 – 8 yrs