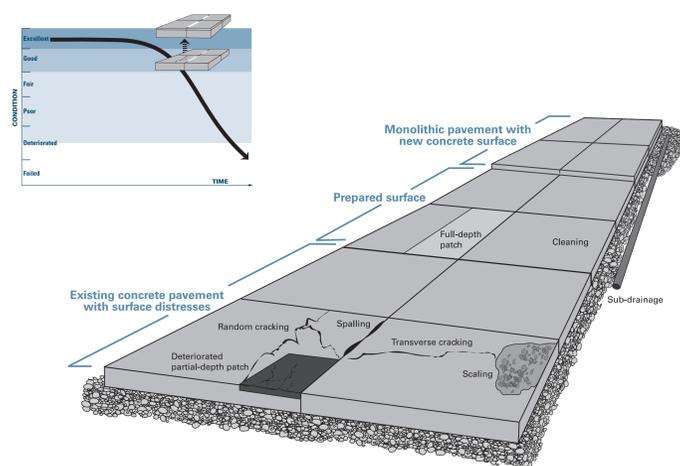


Bonded Family

Thickness: 2–5 in. depending on desired life (15–25+ years), anticipated traffic loading, and condition of underlying pavement

Bonded Concrete Overlays of Concrete Pavements

— Overlay and existing concrete pavement act as one monolithic pavement



Existing pavement condition
Good structural condition; some surface distress OK

Applications

- Where increase in traffic loads requires more structural capacity (related benefit: improves friction, noise, and rideability)
- To eliminate surface defects such as extensive scaling or surface cracking
- Where vertical clearances must be met
- In mill and inlay sections

Keys to success

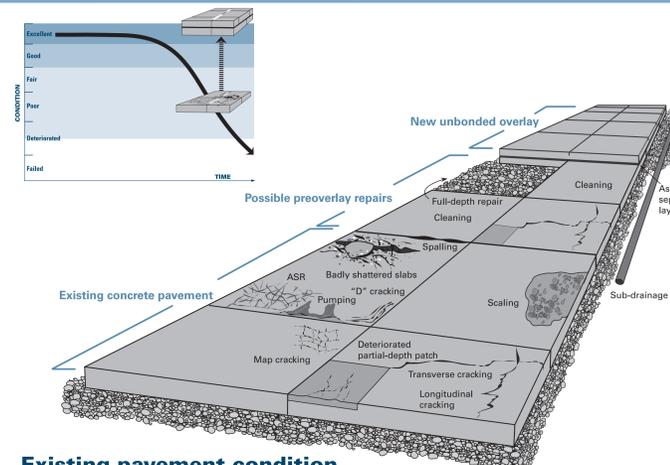
- Existing pavement surface must be prepared to enhance bonding to the overlay
- Overlay's aggregate thermal properties (coefficient of thermal expansion) must be similar to (or lower than) existing pavement's to minimize shear stress in bond
- Working cracks in the existing pavement should be repaired (or the overlay should be sawed over the crack) to prevent the crack from reflecting through the overlay
- Existing joints must be in fair condition or repaired
- Thinner overlays may shorten sawing window
- Transverse joints in the overlay must be sawed full depth plus 1/2 in. (1.3 cm); longitudinal joints must be at least T/2
- Joints in the overlay must align with those of existing pavement because the structure must move monolithically
- Width of transverse joints in the overlay must be equal to or greater than the underlying crack width at the bottom of the existing transverse joint
- Application of curing compound or other curing methods must be timely and thorough, especially at edges

Unbonded Family

Thickness: 4–11 in. depending on desired life (15–30+ years), anticipated traffic loading, and condition of underlying pavement

Unbonded Concrete Overlays of Concrete Pavements

— Overlay serves as a new full-depth pavement on a stable base



Existing pavement condition
Poor condition, including materials-related distress, but stable and uniform

Applications

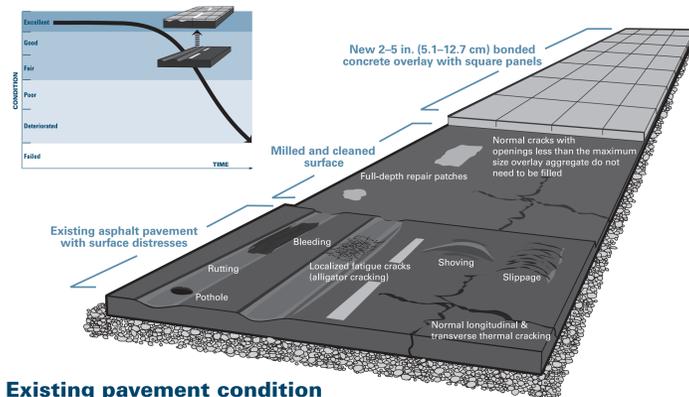
- To restore or enhance pavement's structural capacity
- To increase pavement life equivalent to full-depth pavement
- To improve surface friction, noise, and rideability

Keys to success

- Full-depth repairs should be considered only at isolated spots where structural integrity needs restoring
- A separation layer (typically 1 in. asphalt) is required to separate overlay from the existing concrete and eliminate reflective cracking (to reduce pore pressure and minimize stripping of this separation layer under high truck traffic, provide adequate drainage and a more porous asphalt)
- Some states are experimenting with geotextile materials for the separation layer
- Faulting of 3/8 in. (9.5 mm) or less in the existing concrete pavement is generally not a concern when asphalt separation layer is 1 in. (2.5 cm) or more
- Joints should be sawed in overlay as soon as possible because the sawing window may be short
- Shorter joint spacing than normal in the overlay can help reduce curling and warping stress
- It is not critical to mis-match overlay joints to the underlying joints

Bonded Concrete Overlays of Asphalt Pavements

— Overlay and existing concrete pavement act as one monolithic pavement



Existing pavement condition
Fair or better structural condition with surface distress

Applications

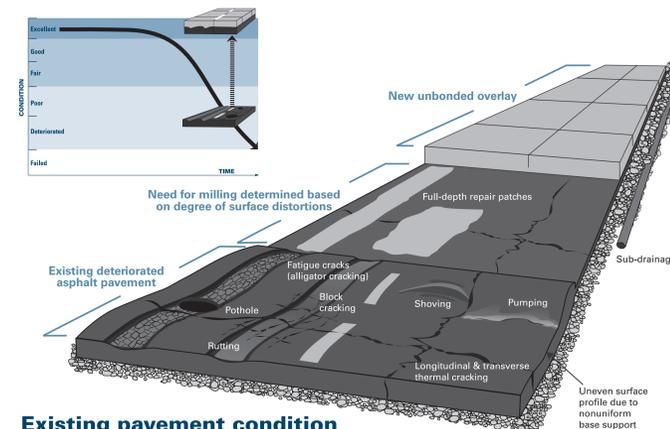
- Where increase in traffic loads requires more structural capacity
- To eliminate surface defects such as rutting and shoving
- To improve friction, noise, and rideability
- Where vertical clearances must be met

Keys to success

- Milling of existing asphalt may be required to eliminate surface distortions of 2 in. (5.1 cm) or more and to help provide good bond; minimal spot repairs may be required
- Asphalt surface temperature must be maintained below 120°F (48.9°C) when placing overlay
- Joints in overlay should be sawed in small, square panels
- Transverse joints must be sawed T/3 (with special attention to thickened overlay over asphalt ruts)
- Joints in the overlay should not be placed in wheel paths, if possible
- Thinner overlays may shorten sawing window; additional saws are likely to be required
- Application of curing compound or other curing methods must be timely and thorough, especially at edges

Unbonded Concrete Overlays of Asphalt Pavements

— Overlay serves as a new full-depth pavement on a stable base



Existing pavement condition
Deteriorated (severe rutting, potholes, alligator cracking, shoving, and pumping) but stable and uniform

Applications

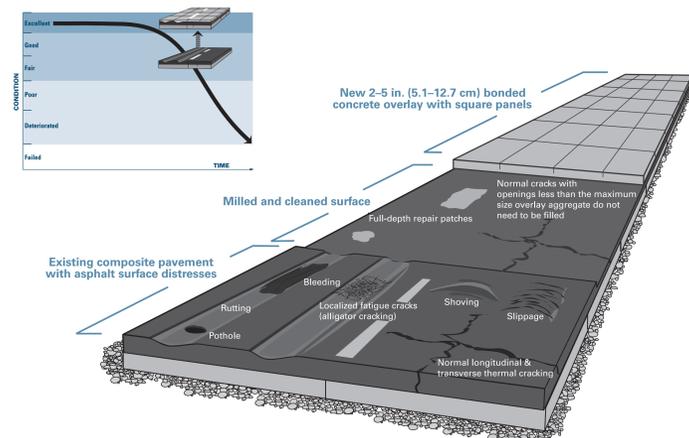
- To restore or enhance pavement's structural capacity
- To increase pavement life equivalent to full-depth pavement
- To eliminate rutting and shoving problems
- To improve surface friction, noise, and rideability

Keys to success

- Milling of existing asphalt may be required to eliminate surface distortions of 2 in. (5.1 cm) or more
- Full-depth repairs should be considered only at isolated spots where structural integrity needs restoring
- Concrete patches in the existing pavement should be separated from the overlay with a thin layer of emulsion, fabric, or other bond breaker; or joints should be sawed in the overlay around the concrete patch perimeter
- Joints should be sawed in overlay as soon as possible because the sawing window may be short
- Surface temperature of existing asphalt pavement should be maintained below 120°F (48.9°C) when placing overlay
- Partial bonding between the overlay and the existing asphalt pavement is acceptable and may even improve load-carrying capacity

Bonded Concrete Overlays of Composite Pavements

— Overlay and existing concrete pavement act as one monolithic pavement



Existing pavement condition
Fair or better structural condition with severe surface distress

Applications

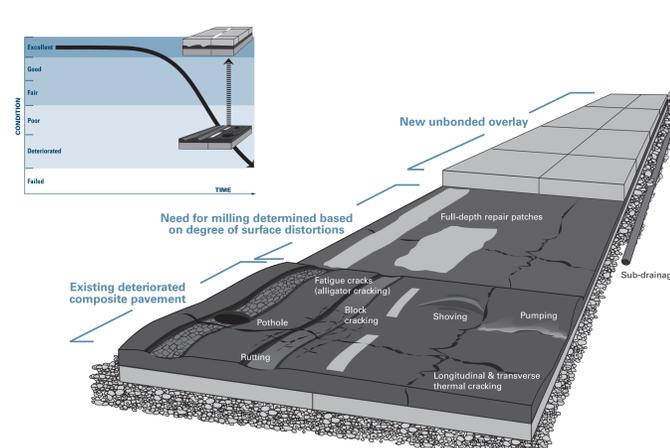
- Where increase in traffic loads requires more structural capacity
- To eliminate surface defects such as rutting and shoving
- To improve friction, noise, and rideability
- Where vertical clearances must be met

Keys to success

- If the existing pavement profile indicates isolated areas of vertical distortion in the underlying concrete that could signal movement from drainage or materials-related distresses, repairs may be necessary
- Milling of existing asphalt may be required to eliminate surface distortions of 2 in. (5.1 cm) or more and to help provide good bond; minimal spot repairs may be required
- Existing asphalt pavement surface temperature must be maintained below 120°F (48.9°C) when placing overlay
- Joints in overlay should be sawed in small, square panels
- Transverse joints must be sawed T/3 (with special attention to thickened overlay over asphalt ruts)
- Joints in the overlay should not be placed in wheel paths, if possible
- Thinner overlays may shorten sawing window; additional saws are likely to be required
- Application of curing compound or other curing methods must be timely and thorough, especially at edges

Unbonded Concrete Overlays of Composite Pavements

— Overlay serves as a new full-depth pavement on a stable base



Existing pavement condition
Deteriorated (severe rutting, potholes, alligator cracking, shoving, pumping, and past materials-related distress) but stable and uniform

Applications

- To restore or enhance pavement's structural capacity
- To increase pavement life equivalent to full-depth pavement
- To eliminate rutting and shoving problems
- To improve surface friction, noise, and rideability

Keys to success

- Milling of existing asphalt may be required to eliminate surface distortions of 2 in. (5.1 cm) or more
- If the existing pavement profile indicates isolated areas of vertical distortion in the underlying concrete that could signal movement from drainage or materials-related distresses, repairs may be necessary
- Full-depth repairs should be considered only at isolated spots where structural integrity needs restoring
- Concrete patches in the existing asphalt pavement surface should be separated from the overlay with a thin layer of emulsion, fabric, or other bond breaker; or joints should be sawed in the overlay around the concrete patch perimeter
- Joints should be sawed in overlay as soon as possible because the sawing window may be short
- Surface temperature of the asphalt layer of the existing composite pavement should be maintained below 120°F (48.9°C) when placing overlay
- Partial bonding between the overlay and the asphalt layer of the existing composite pavement is acceptable and may even improve load-carrying capacity