Building Your First Concrete Overlay

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For The
ND Association of County Engineers
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Retired concrete overlay experts
North Dakota Leadership

- North Dakota is building concrete overlays every year
- Thanks to Cass County – Keith, Jason & Tom
- We have competent engineers with experience
  - Swenson Hagen
  - Ulteig
  - Kadrmas Lee & Jackson
  - SRF
  - Maybe others
What is an “overlay”? Let’s end the confusion......

Formally known as:
- Whitetopping
- Thin Whitetopping
- Thin Overlay

*Let’s think about “resurfacing” with concrete*
Concrete overlays are a method to *resurface* existing asphalt paving—and then some:
- Renew the wear surface—black to white
- Increase the load carrying capacity of the pavement
- Improve lighting—reduce heat island
- Eliminate “perpetual asphalt maintenance”
- To give owners a *choice*

Concrete overlays give support credit to the original asphalt construction for base and subgrade.
Concrete Overlays

- Iowa constructed 24 county concrete overlay projects in a recent year – Over 200 miles of highway
- Other states such as Kansas, Oklahoma, Illinois, Minnesota, Missouri, Michigan, South Dakota and Pennsylvania are also constructing multiple overlay projects
The “Blue” Overlay Book

Guide to Concrete Overlays
Sustainable Solutions for Resurfacing and Rehabilitating Existing Pavements

A practical approach to understanding and successfully using concrete overlays, from selection to opening

### Evaluation

**Table 2: Thumbnails of Asphalt Pavement Distresses**

<table>
<thead>
<tr>
<th>Low to medium severity</th>
<th>High severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alligator Cracking</td>
<td>Thermal Cracking</td>
</tr>
<tr>
<td>Block Cracking</td>
<td>Random Cracking</td>
</tr>
<tr>
<td>Potholes, Popouts</td>
<td>Access/Truck Lane Rutting</td>
</tr>
<tr>
<td>Raveling</td>
<td>Access/Truck Lane Shoving (Slippage)</td>
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</tbody>
</table>
Many concrete overlay options...F.K.A. “Whitetopping”

Summary of Concrete Overlays

**Bonded Family**

- **Bonded Concrete Overlays of Concrete Pavements**
  - **Applications**:
    - Protects inclement traffic loads from pre-existing structural capacity
    - Increases surface finish, noise, and durability
  - **Existing pavement condition**:
    - Good condition
  - **Applications of Composite Pavements**
    - For better structural condition

- **Bonded Concrete Overlays of Asphalt Pavements**
  - **Applications**:
    - Protects inclement traffic loads from pre-existing structural capacity
    - Increases surface finish, noise, and durability
  - **Existing pavement condition**:
    - Fair to better structural condition

**Unbonded Family**

- **Unbonded Concrete Overlays of Concrete Pavements**
  - **Applications**:
    - Protects inclement traffic loads from pre-existing structural capacity
    - Increases surface finish, noise, and durability
  - **Existing pavement condition**:
    - Poor condition including materials-related distresses, but stable and uniform

- **Unbonded Concrete Overlays of Asphalt Pavements**
  - **Applications**:
    - Protects inclement traffic loads from pre-existing structural capacity
    - Increases surface finish, noise, and durability
  - **Existing pavement condition**:
    - Poor condition including materials-related distresses, but stable and uniform

**Bonded Concrete Overlays of Composite Pavements**

- **Applications**:
  - Protects inclement traffic loads from pre-existing structural capacity
  - Increases surface finish, noise, and durability
  - **Existing pavement condition**:
    - Poor condition including materials-related distresses, but stable and uniform

- **Unbonded Concrete Overlays of Composite Pavements**
  - **Applications**:
    - Protects inclement traffic loads from pre-existing structural capacity
    - Increases surface finish, noise, and durability
    - **Existing pavement condition**:
    - Poor condition including materials-related distresses, but stable and uniform
Short joint spacing allows the slabs to deflect instead of bend. This reduces slab stresses to reasonable values.
Concrete Overlays: New life for “existing streets and highways” without reconstruction
Concrete over asphalt—Open to traffic during construction.
Concrete Over Brick
Clay County (Moorhead), MN

- Constructed first concrete overlay project on the county system this year –
  - 8 miles of 6” thick on County 52
  - Sabin south to near Barnesville
4 Inch Concrete Overlay

- ND Army National Guard – Camp Grafton Main Entrance Road
  - Existing 5 to 6” Asphalt
  - Mill off 1” for grade control
  - Expected to handle heavy equipment trucks
What’s New?

- The new national ACPA Concrete Overlay Database
  - [http://www.overlays.acpa.org](http://www.overlays.acpa.org)
  - View information on over 500 overlays throughout the U.S.
  - The list is growing
The Center team has returned to North Dakota

- Oil Field Roads
- Concrete overlays can meet needs
  - Fast Construction
  - Head-to-Head Traffic
  - Reuse of existing asphalt infrastructure
  - Short pilot car operations (3.5 miles)

- Have generated a 12 page report on implementation of concrete overlay technology in oil fields
Paving Operations

Cass County Highway 11 Concrete Overlay

June 2009
Making the Header
Air Blasting

Air Blast Excess Water and Miscellaneous Debris
Protecting the String Line
Setting Up Curing
Dumping the Mix
More Qc & Qa
Managing Cracks?
7’ by 6’ panels
Questions or Comments