Plans, Maintenance of Traffic and Construction

Introductions

- Peter Taylor, ptaylor@iastate.edu
- Gary Fick, Gary@TheTranstecGroup.com
- Brent Burwell, brentburwell@sbcglobal.net

Questions are encouraged since we are practicing physical distancing!

Who is supporting this webinar?

The Concrete Overlay Webinar Series

I. Introduction to Concrete Overlays
II. Overview of Concrete Overlays / Existing Pavement Evaluation and Overlay Selection
III. Concrete Overlay Design
IV. Plans, Maintenance of Traffic and Construction
V. Maintenance of Concrete Overlays and Resources Available to you.

And throughout - examples of how concrete overlays are performing around the country.
Next Week - May 5th
Concrete Overlays and Participate Today in Topic Survey!

Date  Title  
May 5  Our last session of the Concrete Overlay Series:
Concrete Overlays and Resources Available to You
Steve Tritsch, CP Tech Center
Matt Zeller, Concrete Paving Association of MN
Mike Byers, Indiana Chapter - ACPA

Now! Education Topics Survey
We have a link to a short 3-minute survey on a variety of topics for your consideration. Please help by participating in this survey.
We re-posted the link during the session on April 28
https://www.surveymonkey.com/r/Webinar-Int-4-2020

THANK YOU FOR PARTICIPATING
Participate Today in Topic Survey!

Upcoming Webinar Schedule
May 12th & 19th

May 12  Planning and Design ADA Guidelines for DOT, and Municipalities (Understanding PROWAG 2011)
Every professional engaged in road construction become involved in ADA. The May 12 session centers on Planning and Design - Understanding the rules and regulations and how it affects our projects. This session is ideal for DOT’s and Municipalities.
Presenter: Steve Tritsch, CP Tech Center

May 19  How are States Implementing PROWAG: An In-depth look at Wisconsin and Missouri’s Approaches to ADA Compliance
In this webinar, we share a hands-on approach of the Planning and Design and turn it towards the Construction part of ADA. Looking at real-life projects in both Wisconsin and Missouri.
Presenters: Ms. Jackie J. Spoors and Mr. Jesse Jonas, PE

This ADA Webinar Series is offering Professional Development Hours (PDH’s)

Today’s Learning Objectives
Upon completion of this webinar, attendees will be able to:

- Identify typical vertical constraints that require design solutions for mitigation.
- Consideration of balancing maintenance of traffic and its impact on construction cost and schedule.
- Understanding of approaches for reducing the width of the construction zone required for concrete overlays.
- Identification of key inspection items related to concrete paving.
CONCRETE OVERLAY PLANS, MAINTENANCE OF TRAFFIC (MOT) AND CONSTRUCTION

Plan Development for Concrete Overlays

- For agencies that are inexperienced with the design of concrete overlays, the approach should be similar to that of designing an asphalt overlay.
- The location, geometrics and maintenance of traffic requirements should dictate the level of design detail that is required in the plans.

Learning Objectives

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Development of Concrete Overlay Construction Documents

- Contents
  - Developing a Concrete Overlay Project
  - Sample Construction Drawings
  - Guide Specification
  - Costs
  - Design Lessons Learned

Development of Concrete Overlay Construction Documents

- Example Plan Sheets and Details


Identify and Quantify Constraints

- Vertical and horizontal constraints need to be identified during the pavement evaluation

- Existing structures
- Overhead clearances – overpasses, signs and utilities
- Barrier rails
- Existing cross-slope variability and new cross-slope requirements
- Drainage structures
- Existing foreslopes
- Intersections, driveways and field entrances

Traffic Management- Concrete Overlays

Traffic management for concrete overlay projects is no more challenging than for any other paving project, particularly under traffic, as long as straightforward practices are followed:

![Warning Sign]

Work Zone Cost Effectiveness

- Traffic strategies can significantly affect project costs
- Traffic control costs and construction costs should be balanced against the impact to the public
- Many urban intersections have been overlaid with concrete utilizing only weekend work hours
- Agency sets the criteria regarding staging, contractor proposes staging that meets criteria

![Cost Symbol]
Paving

- Maintenance of traffic
  - Depends on concrete overlay thickness
    - If edge drop-off criteria is exceeded, then MOT is just like full depth PCC reconstruction
    - Otherwise, similar to MOT for asphalt projects
  - Options include:
    - Construction adjacent to traffic (lane at a time)
    - Positive separation or cones
    - Pilot car operation for two lane roadways
    - Crossovers and construct full width
    - Staged intersections or full closure with accelerated opening (48 to 72 hr)
  - All concrete overlays are accelerated construction!

Design for 2 Lane Overlay Under Traffic

STAGE 1

Design for 2 Lane Overlay Under Traffic

STAGE 2
**Design for 2 Lane Overlay Under Traffic**

**Reducing Clearances**

- Do not specify a particular piece of equipment or method.
- Define the maximum allowable clearance zone:
  - Traffic
  - Traffic control devices
  - Construction equipment and workers
- Allow the contractor to innovate with their equipment and processes

**Clearance Solutions**

- Adaptation
  - Moving string (ski)
- Innovation
  - Stringless paving
## Concrete Overlays

### Accelerated Construction

- Eliminates exposing subgrade to the weather
- Production is typically (or should be) limited by the capacity to saw joints in a timely manner
- Lane rental and A+B bidding with incentives can be used to motivate accelerated opening
- Normal concrete mixtures can and should be used (Maturity is an answer for opening!)

## Concrete Overlay Construction and Inspection

### Pre-Paving

- Milling the existing pavement
  - Remove distortions of 2” or more
  - Reduce high spots to insure minimum overlay thickness
  - Match adjacent lanes
  - Enhance bond
  - Minimize vertical grade changes
  - Restore profile
- Bonded on asphalt or composite must maintain a minimum of 3” sound asphalt after milling

### Pre-Paving Activity
### Pre-Paving
- Stringline
- Stringless – 3D models for existing/milled surface and concrete overlay
- Profiles optimized to balance
  - Thickness
  - Volume
  - Smoothness

### Placing and Spreading Concrete
- Wet the existing surface - no standing water
- Distribute concrete evenly
- Avoid segregation => effects permeability, strength and shrinkage

### Spreading Concrete
- Continuous supply of concrete to the paver
- Consistent head => smoothness

### Spreading Concrete
- Maintain a consistent head
- too much?
- too little?
Key Inspection Items

- Existing pavement properly wetted
- Look for segregation and/or improperly mixed concrete
- Note times/locations when concrete head is at the extremes

Consolidation

- Match vibrator frequency to workability and paver speed
- Use of a vibrator monitor

Slipform Paver Functions

- Consolidation
- Shaping
- Surface finish
- Pavement smoothness

Over-Vibration

- Vibrator Trails
- Segregation
Shaping/Extrusion

- Extrusion pan – trueness and cross-slope/crown
- Adjust overbuild to form neat edges

Paving

- Maintain a consistent speed
- Slow down or stop?

Hand Finishing

- Identify bumps and dips – overlap straightedge by 1/2
- Correct bumps and dips
- Fill surface voids
- Avoid over-finishing

Hand Finishing

- Visually inspect the pavement edge and surface for proper consolidation
- Some voids are preferable to slurry
### Appropriate Actions

- Adjust vibrator frequency
- Carefully adjust paver speed
- Refine mixture proportions
- Stop paving if the edge keeps falling

### Texturing

- Micro texture - drag
- Macro texture - tining

### Curing

- Before surface evaporation occurs
- Complete coverage

### Appropriate Actions

- Keep rake tines clean and straight
- Don’t delay curing operations waiting for texture to be perfect
- Adjust curing operations for dry and/or windy weather conditions
- Clean/adjust nozzles for uniform coverage
Key Inspection Items

• Uniformity of texture
• Complete coverage of cure

Special Sawing Facts for Concrete Overlays

• Quantity of saw cuts is increased for thinner overlays
• Longitudinal cuts are as critical as transverse
• Increased base friction
• Base movement issues
• Base temperature control
• Mix temperature control – set times

Sawing

• Specify the saw cut depth
• Require adequate number of saws and blades
• Production rates should consider sawing requirements?
  • Example 2,500 CY per day
    • 10” thick x 24’ wide with 12’x15’ slabs = 8,746 lf of sawcut
    • 6” thick x 24’ wide with 6’x6’ slabs = 39,378 lf of sawcut

The Sawing Window

• Saw in the window
• Timing is critical
• Monitor depth of cut (T/3)

![Diagram of sawing window](image)
### Key Inspection Items

- Specified sawing depth and width
- Appropriate saw blades
- Ample saw blades on-hand

### Appropriate Actions

- Adjust mix to control set time
- Change saw timing to match weather conditions

### Examples from Oklahoma
Simplified Plan Sheets for Concrete Overlays

Title Page
- Project No
- Description
- Highway No
- County
- Location Map

Page 1

Typical Section
Details

Plan Notes

Page 2

More Details

Page 3
Pay Item List

Pay Quantity Notes

Construction Notes

List of Standards

More Construction Notes
Overlay Projects

County Road
Kingfisher Co
Multiple layers HMA/Chip seal
Widened with Aggregate Base
5" UBQA
Alternate Bid 5" vs 5"
Concrete Option Won

US 287 Cimarron Co
Two Lane Facility
6,500 ADT
60% Trucks
8" UBQA
Built Under Traffic
Constructed 2007

SE 15th St Del City
Existing 7" PCCP
Full HMA Overlay
Removal HMA
Full Depth Patching
Stitched Longitudinal Cracks
3" Bonded Concrete Overlay
Constructed 2006
US 59 Sequoyah Co
HMA Section < One Year Old
Needed Quick Fix
Designed Field Division
Plan Set 7 Sheets
16 Pay Items

US 69 Pittsburg Co
Designed by Field Division
Simplified Plan Sheets
Inside Lane 4"
Outside Lane 6"
Widened Outside Lane to 14"
Est 25 million ESAL's so far
Constructed 2001