

## Overlays Webinar 5 – Questions and Answers

The questions submitted during the webinar follow with answers that our speakers have provided. Please note that there are several references to CP Tech Center guides and reports that are available without charge in PDF format through the website:

<https://cptechcenter.org/concrete-overlays/>

Recordings of the previous webinars are also available there.

1. Does concrete overlays have to be performed totally by slip form paving or can it be done by forming method?

In Indiana the DOT projects were of significant size & length – all PCC overlays were placed with slipform pavers. However, on some smaller urban projects, roller screeds have been utilized.

2. For repair of cracked BCOA of composite pavement, what would be the repair strategy if the asphalt is of poor condition or too thin? Can you increase the removal depth and do an unbonded concrete patch or a bonded concrete patch to the underlying concrete pavement?

I think it has been discussed quite a bit and yes, replacing the asphalt with concrete should work fine. Try to avoid any abrupt changes in thickness to minimize additional cracking.

3. For Zeller: Does Minnesota use tiebars on BCOA panel replacements or are panel sizes too small? If multiple panels are repaired, what is the max. repair area to warrant use of a tiebar? Assume overlay is 5" thick.

We have used ties bars on many of our thin overlays. We've also gone without or have tried an FRC overlay. The tie bars hold the concrete nice and tight. The fibers seem to work well too. We have seen some separation on longitudinal joints with no ties. I think we have tied full depth repairs on thin concrete overlays back into the original. If I remember correctly, we used 18" long #4 or #5 bars. There is not a lot of stresses on those bars. If the rest of the overlay used tie bars or FRC, I would suggest tying the repairs back, 2 bars per 6 foot panel.

4. Has Indiana considered using GPR to scope existing asphalt depth?

Yes, Indiana has utilized GPR to evaluate existing pavements. Some in a forensic application & increasing use in preliminary evaluation of potential projects.

5. How do we identify reflecting reflective cracking in concrete pavement? Oklahoma

AND

How do you identify a reflecting crack?

We typically look for signs such as cracks in the shoulder or C&G.

6. When we do the full depth repair, is there any requirement on the minimum section length we need to consider?

We have done single 6x6 panels. I do not think there needs to be a minimum. I also believe this would be a simple operation to teach agency maintenance crews to do themselves.

7. When do we apply tack coat in concrete pavement overlays?

We have never used a tack coat pre overlay. Cleaning the existing pavement appears to work best.

8. Is there document/report that explains the detailed procedure of doing partial depth repairs?

Here are links to Minnesota's rehabilitation standards as well as a YouTube video for partial depth repairs.

<http://www.dot.state.mn.us/materials/concretepavementrehabilitation.html>

<https://www.youtube.com/watch?v=m5Ut3se2QSg>

CP Tech Center also has a publication at

[https://intrans.iastate.edu/app/uploads/2018/08/PDR\\_guide\\_Apr2012.pdf](https://intrans.iastate.edu/app/uploads/2018/08/PDR_guide_Apr2012.pdf)

9. How do we select the repair method for a specific site?

Practice really helps. Surface defects can typically be repaired with a partial depth repair. Structural flaws/cracking may have to be repaired using full depth repairs. If the panel is breaking apart, most likely a full depth patch will be required. Single cracks are not always indicative of a need to replace the panel.

10. What do we need to do at interface of concrete and asphalt?

The biggest thing to look for is bond. Is the concrete and asphalt still bonded? Did it break apart below or at a lift line? Did coring cause the separation? Does the asphalt look sound? The biggest part of this is to know if the concrete will bond back to the existing asphalt, if not you may have to remove more asphalt and use thicker concrete.

11. Is there any minimum thickness requirement for concrete overlays?

In Indiana – 4”

12. I love attending NAPA webinar. Thank you for organizing them. Is there any way that I can subscribe for NAPA webinars so that I can get notified whenever a new webinar is being offered?

We at the National CP Tech Center have added you to our mailing list.

13. In Indiana, for the SR 3 project. Did the asphalt shoulder settle since it has been constructed?

Not aware of any settling of HMA shoulders

14. On the partial depth repairs that were successful, was there any modifiers used? High-early, etc.

Minnesota has tried a lot of different things with our partial depth repairs over the years. We always come back to our high cement factor 3U18 mix. We have also used admixtures to get 3 or 4 hour opening strengths, but with the work done at MnROAD we may not need the admixtures to allow traffic on the repairs earlier.

15. Please provide resources going deeper into dowel types and placement configurations and states' experiences related to these variations for full depth concrete and for concrete overlays.

Guidance on dowels is available in Chapter 4 of the "Guide to Concrete Overlays"

[https://intrans.iastate.edu/app/uploads/2018/08/Overlays\\_3rd\\_edition.pdf](https://intrans.iastate.edu/app/uploads/2018/08/Overlays_3rd_edition.pdf)

16. What criteria has been used to determine whether or not fibers are used in the mix?

In Indiana the Agency made a subjective decision to utilize macro synthetic fibers on all 4"- 6" PCC overlays – benefit of increased toughness & residual strength.

You could also reference

<https://intrans.iastate.edu/app/uploads/2019/10/MAPbriefMarch2019.pdf>

17. Have we seen any difference in longitudinal joints opening up when fibers are used or not used?

MN and IA have seen untied joints open up more than tied (steel or fiber)

Indiana has only built thin PCC overlay projects with fibers, so no comparison – but longitudinal joints have remained tight.

18. What is SCM?

Supplementary Cementitious Materials – typically fly ash and slag cement

19. Does the application of curing compound promote bonding?

It would be unusual to apply curing compound to an old concrete bottom layer. If so, it would likely act as a debonding layer. Applying it to the top of the new layer would reduce warping, which may appear to affect bond indirectly.

20. How do you go about determining the number of saws you'll need for the job?

(Indiana) Planned SYS scheduled to pave each day, calculate LFT of joint to be sawed, divided by LFT of joint each saw can cut within two hour window = number of saws required. Plus have at least one backup saw.

21. Did you use movable traffic signals in lieu of flagmen?

On the Indiana SR 9 project – on the northern 7 miles of the project traffic was directed one way, southbound only, through the project with minimal flagging. At the southern end of project where the contractor had to maintain 2-way traffic through the one lane available – contractor utilized temporary traffic signal & pilot cars to control traffic flow.

22. What is the cost of repairing the BCOA? What was the thickness of the existing asphalt pavement over which the BCOA was done?

AND

What type of costs were there per square yard or cubic yard of placement for both partial and full depth repairs?

The MN TH 30 project was a while ago so prices would not be representative, but they were similar to a standard repair cost. The price of full depth repairs

may be a little less than average since they are thinner. There were sections of 3” and 5” remaining asphalt. More information can be found in this report.  
<http://dotapp7.dot.state.mn.us/research/pdf/2002MRRDOC008.pdf>

23. What grade of concrete is used for BCOA?

Conventional paving grade mixtures are used in overlays

24. What is your best practice for reflective cracking? Arkansas

Reflective cracking for the unbonded concrete overlay on concrete is generally mitigated with the required use of an interlayer (asphalt or geotextile). Unbonded overlays on asphalt have seldom exhibited incidence of reflective cracking if cracks greater than 2” wide are filled prior to the overlay. Experience with bonded concrete overlays on asphalt or composite pavements is similar. Reflective cracking can be expected in the bonded concrete overlay on concrete. Some agencies have mitigated the cracking with use of structural fiber mixtures and several projects performed successfully by placing tie bars over random cracks, directly on the base pavement.

25. What is your take on the use of pervious concrete pavement overlays in areas with low volume traffic? Further, are there any case studies that depict its performance over design life pertinent to structural distresses, their severity, rate of occurrence, rehabilitation measures, and some other functional performance measures such as roughness, texture, and noise?

There is little recorded experience with pervious concrete pavement in the overlay application.

26. What were the biggest challenges with use of plate dowels?

Please see p 67 of

[https://intrans.iastate.edu/app/uploads/2018/08/Overlays\\_3rd\\_edition.pdf](https://intrans.iastate.edu/app/uploads/2018/08/Overlays_3rd_edition.pdf)

27. What were the biggest challenges with both partial and full depth repair of the concrete overlays?

Rehabilitating TH 30 was not a challenge, very low traffic. Our contractors and most agencies understand our CPR processes. Very little challenge to the repairs themselves unless the concrete or asphalt is overly deteriorated.

28. What were the dimensions of the safety edge placed on the Indiana overlay?

Indiana standard detail – 30 degree slope starting 7” off the edge of pavement.

29. When doing full depth or partial depth patching, are there any restrictions to consider if using a high early mix for patching of PCC overlays?

We have used ultra-high early strength mixes (3-4 hours) on more traditional repair projects and have seen no issues. That being said the opening strength work being done at MnROAD has shown that often time the opening strength achieved with standard mixes will suffice of 12-24 hour openings.