Concrete Overlay Repair and Replacement Strategies

Tech Tuesday Webinar Q&A

11/19/2024

The questions and comments submitted during the webinar followed with answers that our speakers have provided.

Q1: If your concrete overlay has microfibers in it, is it better to mill or break up the concrete? Do the microfibers cause issues with the milling machine? (Kansas)

A1: Micofibers should not cause problems with the milling operation. When milling concrete using a properly chosen milling drum it is effectively a chipping process. Concrete fragments are chipped away from the mass by repeated striking of the milling head teeth. The chipping process has enough energy to break the fibers. The efficiency will be optimized by the combination of down-pressure on the milling head, milling drum rotational speed, and forward travel speed of the milling machine. The slower the forward travel speed of the machine, the more time teeth contact the material at any given drum rotational speed.

Q2: Have you encountered any push-back from milling contractors about milling concrete pavement to place new PC Overlay (or HMA Overlay)? (Iowa)

A2: Only if the contractor is uninformed or unaware that there is equipment specially designed to mill concrete. Contractors with smaller machines and standard cutting heads designed for asphalt may push back saying that it will be too hard on their equipment. If they don't have the right equipment or the aggregates have a high Mohs hardness, they may be right. However, like most tasks, having the right tool is the key. The proper milling head and teeth are explained in the new document.

Q3: Could you please explain whether damage caused by ASR should be mitigated differently, or if it matters less when using the overlay preservation and repair methods? (Michigan)

A3: A concrete overlay with ASR, like any concrete pavement with ASR, will have to be fully replaced if the ASR is in an advanced state. I would not rely on an overlay with ASR to be used as a layer in a new concrete overlay system. This would likely be too risky, and the responsible choice would be to remove the infected concrete and replace it. A thin asphalt overlay might also be considered to hold the material together until replacement can be programmed. If the ASR is in very early stages or it can be determined to have run its course through petrography, one might employ some patching as a temporary fix. We have a complete table in the document providing suggestions on how to handle different distresses.

Q4: Many of our overlays are 6" thick BCOA. Sometimes removal includes some asphalt. What is the best method to ensure repair bonds to existing asphalt? (Pennsylvania)

A4: Repair Scenario: The best method to handle the interface between the new concrete and an existing concrete in a full-depth repair is to remove the loose material down to sound material (asphalt per your description). It does not matter that the asphalt below the existing overlay is disturbed and in fact putting

the patch back thicker than the nominal overlay thickness works better based on performance reviews. You don't have to do anything other than remove loose material (dust, debris) prior to placing the concrete. Pour the repair concrete directly onto the old asphalt and it will adhere enough to perform well.

Replacement Scenario: If you are removing an overlay to replace it, then you will want to make sure the surface on which you are paving the new overlay has a uniform texture. The way to accomplish that is to kiss mill the surface (asphalt cutter head) to even it up.

Q5: How does Grinding work with metal? (Idaho)

A5: I assume you mean milling. It works fine with dowel bars and lane tie bars. As mentioned in the document, distributed steel mesh or reinforcing steel may get wrapped in the milling head. In the case of reinforced overlays (which is rare) the better option is rubblizing so the steel can be separated more easily. Another option is to look at a partial overlay option where you only mill partially through the existing overlay and do not encounter the distributed steel.

Q6: Don't you think thicker overlays increase the profile? As a result, they might cause under clearance issues under bridges.

A6: Absolutely thicker overlays increase the profile more than thinner overlays. They also last longer and are almost always more cost effective in the long run. For any locations where overhead clearance becomes an issue, we provide standard details to transition the overlay to a standard section under the bridge and then back out again. Check out the details on figure 7.11 of the 4th Edition of the Guide to Concrete Overlays. It would be to anyone's advantage to look at transitioning pavements for clearance issues rather than letting a few bridges dictate the strategy for an entire project.