

Daily Trip Report

Office of Construction Administration

DATE of TRIP: May 30, 2024

PROJECT NUMBER: 233008

C-R-S: FAY – 435 – 1.52

DISTRICT: 6

NAME: Julia Miller, Construction Pavement Engineer

Project Background

Project 233008 is a design-build job for the concrete pavement widening of SR 435 and associated ramps at IR 71.

The John R Jurgensen company (JRJ) was awarded the contract, and on the day of this review, was placing Item 452 non-reinforced concrete on a westbound section of SR 435 near the IR 71 interchange (approximate STA 45+95 to 57+68).

Review of Work

JRJ was placing 10.5 inches of Item 452 non-reinforced concrete pavement (Ernst Concrete, JMF- C750291P1A) using a 3-tube roller screed. The concrete was being placed and spread on the Item 304 aggregate base from ready-mix trucks. Dowel baskets at contraction joints (15 feet spacing) were previously installed. The concrete slump was 5 inches. The concrete testing was performed by ODOT personnel.

The dowel baskets required adjustment due to misalignment issues arising from the uneven grade. The specifications (451.09 B.1.) require dowel basket assemblies to be placed “in a position parallel to the surface and centerline of the slab at mid-depth of the slab thickness”. There was a noticeable inverted slope to the middle of the lane and thus the baskets assemblies were following that same inverted slope causing the contraction joints to be out of alignment with the final slab surface and not at mid-depth.

Additionally dowel basket assemblies in a standard 12-foot wide lane require the use of 8 steel pins; all baskets only had 6 pins.

It was confirmed by the concrete foreman that dowel bars were oiled the day before concrete placement; 451.09 B. requires the dowels to be oiled “within 2 hours prior of placing concrete”.

The following photos illustrate the observations regarding the dowel bar assemblies and the lack of dowel basket assembly pins.



Inverted slope on 304 aggregate



Lack of pins at basket assembly



The use of a roller screed was allowed in lieu of slip form paving due to the constraints of the project, mostly related to the MOT configuration and the requirement to keep access to the outlet mall and related stores on the north side of SR 435.

The slump at the time of placement was about 5 inches as allowed by Table 499.03-4 with the use of a Type F or G chemical admixture. Per the approved JMF, Euclid Chemical, PLASTOL 6425 was used and complies with ASTM C 494, Type A and F admixture.

The 304 aggregate base was moist during placement, so the addition of water wasn't necessary, but this should be evaluated throughout the placement day as drying wind and temperatures may necessitate the addition of water later.

The contractor had 2 laborers with spud vibrators during placement. However, there was not consistent vibration of the concrete throughout, but due to the high slump the concrete appeared to segregate easily under vibration with noticeable paste (cement slurry) on the surface. Therefore, the use of additional vibration may have been more detrimental than not.

The amount of paste (cement slurry) carried by the roller screed was very noticeable. The issue with excess paste includes the reduction of strength and durability in the final product.

It was noticed that the finishers were spraying/misting the surface prior to using the 10-foot bump cutter and floats. When questioned about the contents the concrete foreman stated that that spray cans contained water and he told the finishers to stop.

The tining and curing operations were not observed.

The following photos show the paving operation.

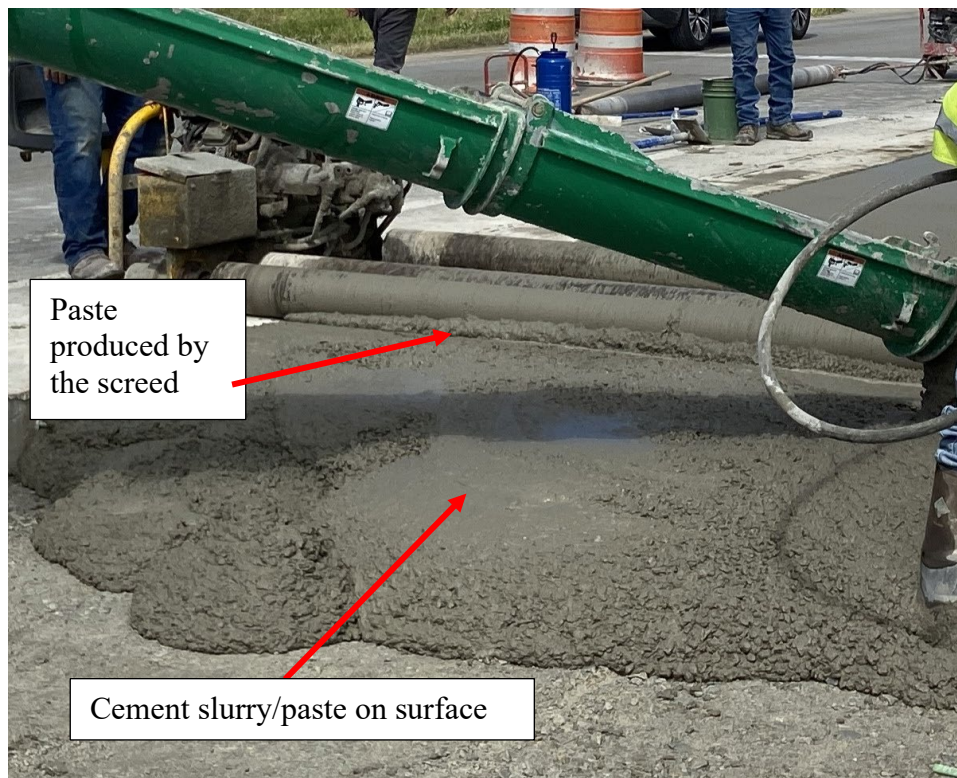


Three-tube roller screed – Note the paste production at the top of the slab



Spray cans
with water

General view of the paving operation. Note the blue and red spray cans. These contained water.



Paste
produced by
the screed

Cement slurry/paste on surface

The high slump and vibration seemed to induce segregation in the mix

Remarks

Roller Screed and Segregation

The contractor's use of the 3-tube roller screed was accepted by the Department in lieu of using a standard slip form paver. The specifications allow this use under certain conditions which were met on this project due to MOT issues.

The slump was much higher than used with slip form paving and the mix appeared to segregate during ready-mix truck discharge, manual vibration, and screed advance. The high slump concrete and the appearance of cement slurry/paste on the dumped concrete piles is a concern for strength and durability.

It was noted that the laborers were not particularly diligent in vibrating the concrete prior to the screed advance as required by the specifications. But it was observed that any additional vibration seemed to make segregation issues worse.

Mixing time and water-cement ratio can contribute to concrete segregation at placement and finishing; therefore it is recommended that these items be reviewed with the contractor at the project level. Also it is recommended to cut some additional cores at the same time as the thickness/strength cores are obtained. The cores can be visually examined for segregation.

Other Items of Concern

There were a few items that were addressed with the paving foreman at the time of this site review that should continue to be monitored for specification compliance. These include:

- Checking the 304 grade for conformance to the cross-section;
- Using the correct number of pins for securing dowel basket assemblies;
- Checking dowel basket assemblies for proper alignment with the slab;
- Oiling dowels within 2 hours prior to placement of concrete;
- Ensuring NO water is sprayed on the surface to aid finishing;
- Confirming the aggregate base is thoroughly moist at the time of placement.

Notes on Design-Bid-Build or Design-Build Requirements

All plans that include concrete pavement should be reviewed for constructability using a standard slip form paver, either formless or using forms (ride-on type). This should be done at the design phase when MOT scenarios are being formalized. The goal is to eliminate the use of hand methods that use vibrating truss screeds and roller screeds by allowing adequate length and space to slip form pave.

In design-build jobs that include MOT in the contractor's design scope of work, the requirement to provide a design that maximizes the use of standard slip form paving should be considered.