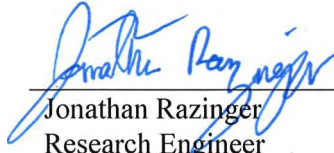


Prepared by:


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Attendee(s):

Jonathan Razinger, Research Engineer

November 22, 2017

FINAL FIELD REPORT

U2017 - 07

Assessment of Super-Slab, a Precast Concrete Slab in a Bridge Approach Application

Overview:

The Super-Slab System by Fort Miller Co. was installed on two the bridges, Chester BRF 025-1(28) and BRF 025- 1(37), roughly 0.25 miles apart along VT 103 in the town of Chester. Both bridges were combined into a single contract and were complete bridge replacement projects, which included minor roadway approach and channel work. Both bridges along this National Highway System (NHS) route were replaced and the Super-Slab System installed in 2011. This report summarizes the August 2017 field visit of this bridge.

The purpose of this study was to examine and evaluate the impacts to construction sequencing, constructability, overall performance, and life cycle cost of the Super-Slab system. Research personnel assessed the product's durability in a bridge approach application. By using the Super-Slab system on bridge approaches, VTTrans expects comparable or better performance, cost and ease of installation compared to the standard approach: cast-in-place approach construction.

Bridge 8 Site Visit – VT 103, Chester VT

EA: Experimental Features – SPR 352

Work Plan: WP 2011 R-1

Date: Wednesday, August 30th, 2017

Time: 2:00 PM to 2:45 PM

Weather: 71°F, Sunny

A site visit to Bridge 8 in Chester was conducted as part of an investigative check. Observations and photos on the performance and appearance of the Super-Slab System after installation were collected and can be seen in the photos below.

Background on Site:

The Super-Slab System was used on the Chester bridge project, Chester BRF 025-1(28). Bridge 8, which spans 61.25 feet is located on VT 103 near mile marker 2.2. This structure consists of precast concrete "NEXT-D" beams and also incorporates concrete precast abutments. One of the abutments sits on bedrock and the other abutment on steel H piles. The approach slabs were rectangular, 32.0 feet wide by 20.0 feet long and covered with about 2.5 inches of pavement. Average annual daily traffic (AADT) at the location of these bridges was approximately 7100 vehicles in 2008.

Bridge 8 Super-Slab System Site Visit Photos & Notes:



Overall views of Bridge 8 on VT 103, Chester VT. The left photo shows the west end of Bridge 8 looking towards the east, while the right photo shows the east end of the bridge looking towards the west.



Side view of Bridge 8 from the west end looking to the east.



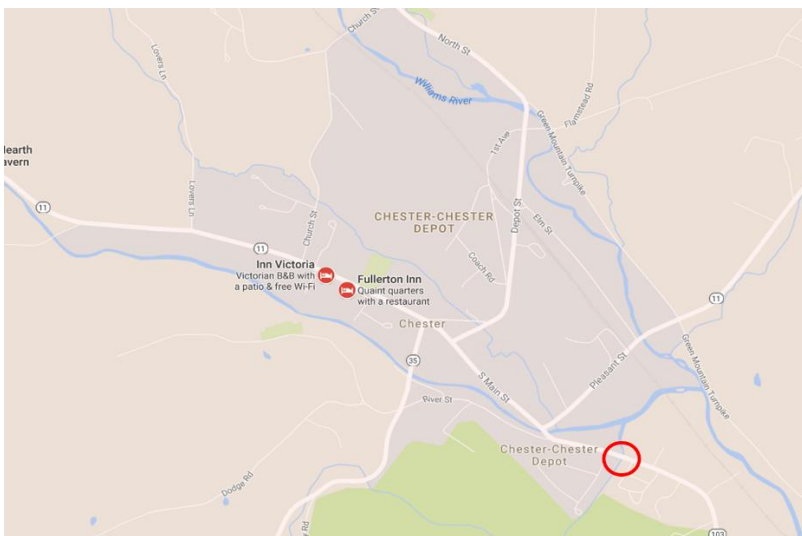
The photo on the left shows the bridge joint on the east end of the bridge, while the photo on the right shows the bridge joint on the west end of the bridge. The bridge joints were in good condition.



East end approach cracking. From left to right; 1st transverse crack (approximately 19ft from the east end bridge joint), 2nd transverse crack (approximately 39ft from the east end bridge joint) and 3rd transverse crack (approximately 59ft from the east end bridge joint). Two longitudinal wheelpath cracks (one for each wheelpath) were observed emanating from the 1st transverse crack on the westbound lane. A longitudinal crack was also noted emanating from the 1st transverse crack on the left wheelpath within the eastbound lane. No wheelpath cracking was noted on the eastbound lane near the 2nd and 3rd transverse cracks, but a small 2ft wheelpath crack was found on the westbound side near the 3rd transverse crack. It should also be noted that differences in the pavement (color) was evident approximately 60ft from the east end bridge joint.



West end approach cracking. From left to right; 1st transverse crack (approximately 20ft from the west end bridge joint), 2nd transverse crack (Eastbound side) and 2nd transverse crack (Westbound side), both approximately 55ft from the west end bridge joint. On the eastbound side a 20ft longitudinal crack between the wheelpaths was noted connecting the west bridge joint with the 1st transverse crack along with small wheelpath cracking. Two wheelpath cracks that extended 8ft on the eastbound side (one on each wheelpath) near the 2nd transverse crack were also observed and can slightly be seen in the middle photo. An extensive wheelpath crack was also noted on the westbound lane near the 2nd transverse crack, seen in the far right photo.



The location of Bridge 8 is represented by the red circle on this map from Google Maps.

Most Recent Bridge Management and Inspection Unit Observations:

The Bridge Management and Inspection Unit conducted their last inspection on 6-1-2017. The inspection personnel concluded that Bridge 8 was in good condition. The longitudinal or transverse cracking on the bridge approaches were not mentioned in their recent maintenance report. The structure inspection, inventory and appraisal sheet can be found ([here](#)) and the June 1st 2017 photos can be found ([here](#)).

Bridge 9 Site Visit – VT 103, Chester VT

EA: Experimental Features – SPR 352

Work Plan: WP 2011 R-1

Date: Wednesday, August 30th, 2017

Time: 1:20 PM to 2:00 PM

Weather: 71°F, Sunny

A site visit to Bridge 9 in Chester was conducted as part of an investigative check. Observations and photos on the performance and appearance of the Super-Slab System after installation were collected and can be seen in Figures below.

Background on Site:

The Super-Slab System was used on the Chester bridge project, Chester BRF 025-1(37). Bridge 9, which spans 122.97 feet is located on VT 103 near mile marker 2.5. This structure consists of precast concrete abutments and deck panels on curved steel girders. Both abutments sit on steel H piles. The approach slabs are irregularly shaped due to the road curvature and skewed abutments. The approaches are approximately 36.0 feet wide by 20.0 feet long and covered with about 2.5 inches of pavement. Average annual daily traffic (AADT) at the location of these bridges was approximately 7100 vehicles in 2008.

Bridge 9 Super-Slab System Site Visit Photos & Notes:



Overall view of Bridge 9 from the east end looking west on VT 103, Chester VT.



Side view of Bridge 9 on VT 103, from the east end looking to the west.



The photo on the left shows the bridge joint on the east end of the bridge while the photo on the right shows the bridge joint on the west end of the bridge. The bridge joints were in good condition.



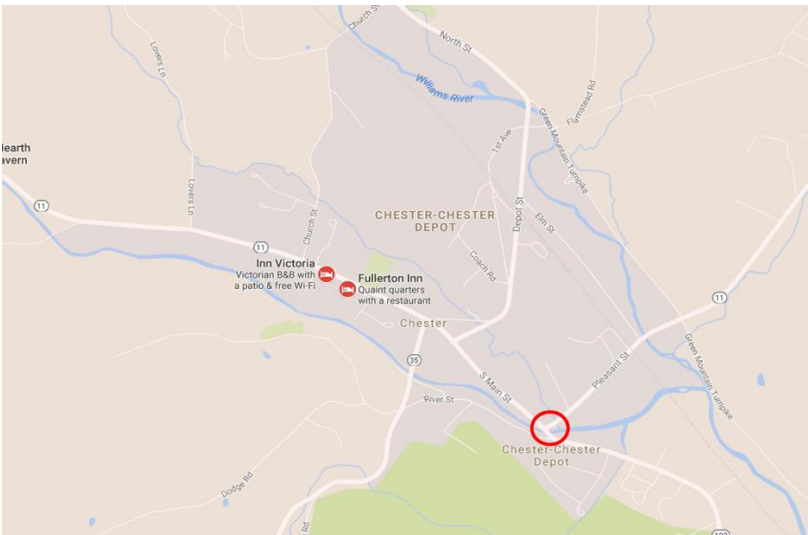
Bridge 9 east end approach cracking. The top photo shows both longitudinal and transverse cracking within the westbound wheelpath. The bottom left photo shows a 26 foot centerline longitudinal crack emanating from the east end bridge joint, while the bottom right photo shows a transverse crack across the width of the bridge approximately 19ft west of the east end bridge joint. A few wheelpath cracks were also observed on the westbound lane. Two of them were 4 – 5ft in length and one was 18ft in length. A 14 foot eastbound wheelpath crack emanating from the east end bridge joint was also noted. No other cracking was observed or noted on the bridge deck.



West end approach transverse cracking across the width of the bridge, 18ft east of the west end bridge joint. Wheelpath cracking, approximately 18 – 24 feet in length was observed extending from the west end bridge joint on the westbound lane. Smaller right wheelpath cracking was also noted on the westbound lane turning onto Pleasant Street. A Close-up can be seen below. No wheelpath cracks were found on the eastbound lane.



Close-up of west end approach cracking and wear within the wheelpath turning onto Pleasant Street. Three cracks were approximately 4ft in length and one was 11ft in length.



The location of Bridge 9 is represented by the red circle on this map from Google Maps.

Most Recent Bridge Management and Inspection Unit Observations:

The Bridge Management and Inspection Unit conducted their last inspection on 6-1-2017. The inspection personnel concluded that Bridge 9 was in good condition. The longitudinal or transverse cracking on the bridge approaches were not mentioned in their recent maintenance report. The structure inspection, inventory and appraisal sheet can be found ([here](#)) and the June 1st 2017 photos can be found ([here](#)).

Summary:

The performance of the Super-Slab System is supported by the visual inspection and photographic evidence gathered during the recent site visits. This study has surpassed its initial (no less than 3 years) study duration detailed in the approved FHWA Work Plan. The field visit documentation shows longitudinal and transverse overlay cracking on the approaches of both Bridge 8 and 9 on VT 103 in the town of Chester. It is difficult to determine from just the visual inspections if the observed approach cracking was only and directly caused by the Super-Slab System, but the location of the transverse cracks at approximately 20ft intervals (slabs were 20ft in length) suggests that they are most likely reflective or thermal cracks caused by the movement of the Super-Slab beneath the surface overlay. The origins or cause of the observed surface cracks could be determined by imaging the subsurface road layers through non-destructive evaluation (NDE) methods, like Ground Penetrating Radar (GPR). The use of GPR might determine if deterioration of the concrete slab or movement, such as buckling or shifting of the Super-Slab System, is causing the observed cracking. A cost benefit analysis, which would be included in the Project Final Report would also determine if the Super-Slab System is a viable alternative to the standard cast-in-place approach construction. Results from this study will be given to the VTrans Structures and Pavement Sections for consideration on future bridge approach and roadway designs.