

**UHPC Bridge Deck Overlay in Sioux County, Iowa**

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**Primary Topic Area: Application/Projects**

**Secondary Topic Area: Bridges**

**Date Submitted: (10/17/2018)**

**Abstract**

Ultra High Performance Concrete (UHPC) on bridges in the United States have typically been joint applications with limited deck overlay placements. Iowa Department of Transportation (DOT) let a pilot project for UHPC bridge deck overlay on a 205.5 ft x 44 ft Pretensioned Prestressed Concrete girder bridge on US 18 over the Floyd River in Sheldon, Iowa. The project has sufficient quantity to be the first machine

## Second International Interactive Symposium on Ultra-High Performance Concrete

placed UHPC overlay in the United States. The existing bridge condition is suitable to test UHPC material placement as a repair and rehabilitation strategy.

The project required staged construction to maintain one lane of traffic at all times. The UHPC machine placement plan included a two-layer approach, different fiber percentages per layer and multiple passes to achieve 1 ¾" depth overlay. It addressed machine placement widths, minimized the number of steel fibers on the road surface, and compensated imperfections in the surface from the first layer.

The UHPC deck overlay pilot project revealed that the UHPC is a strong material that functions as a waterproofing element and increases the structural capacity as compared to conventional overlay mixes. Using a paving machine was intentionally oversized for this small bridge but demonstrated the feasibility of how efficiently the overlay can be deployed on larger structures. Required surface finish smoothness was achieved by conventional grinding technique and longitudinal grooving provided bridge deck texture. Due to the rapid hardening of the UHPC, the bridge was opened for traffic three days after the last placement.



**Figure 1. UHPC Installation with paving machine**