



Counter-clockwise from top: After 40 years without a major upgrade, Dodge County's Highway A still had a solid base, but its surface was showing the expected wear. Photo courtesy of WCPA.

Milling off 2 inches of asphalt smoothed out the profile, adjusted the cross slope and created better adhesion for the coming layer of concrete.

Dowel baskets at all joints strengthen the pavement and transfer loads to provide a smooth ride over time and longer life.



Concrete Atop Asphalt *Renews Highway*

Dodge County finds concrete overlay is cost-effective upgrade

By Mike Larson, editor

Dodge County, Wis., recently resurfaced 4.25 miles of its County Highway A near Beaver Dam, Wis., by paving concrete over the existing asphalt. It is believed to be the first “white topping” of any Wisconsin county highway in more than a decade.

Making The Choice

Dodge County Highway Commissioner Brian Field explained how the county decided to lay concrete over asphalt. “This stretch of highway carries a lot of traffic, including

a high volume of 18-wheel trucks,” he said. “The existing highway’s base was sound and firmly settled into the ground, so there was no need to rip it up and start from scratch. And the paving industry’s competitive climate pulled the cost of concrete into line with that of asphalt. Paving concrete over the existing highway was the best choice,” he said.

More Than A Pave-Over

Because this was Highway A’s first major renovation in 40 years, the project included several upgrades to improve safety

Concrete Atop Asphalt

and functionality: The shoulders were paved with concrete, together with the driving lanes. Two intersecting roads were realigned to meet Highway A perpendicularly, rather than at a sharp angle, thereby improving visibility, safety and traffic flow. Deceleration/turn lanes were added at four intersections. Curb and gutter were added to intersections that did not have them, and the turning radius of some intersections was softened, too.

Dodge County Assistant Highway Commissioner Peter Thompson explained, “We not only wanted to give the driving public a smooth ride and a long-lasting surface, we wanted to make this road the best we could for the next 40 years.”

Much Of Project Done In-House

Once the type of surface had been chosen, the Dodge County highway department swung into action, surveying, buying right of way, designing the roadway, deciding which parts of the project it could do itself, selecting what work it should contract out, and preparing the bid specs.

Ultimately, county crews performed all the dirt work, the realigning of two intersections, connecting of intersecting roads and driveways to the new road with asphalt paving, post-construction landscaping, and sign placement.

Operations contracted out: milling the existing roadway, paving the concrete overlay and epoxy-painting of the pavement markings.

Said Field, “We were pleased that we could do so much of the job with our own staff and crews. And we appreciated the technical assistance we got from the Wisconsin Concrete Pavement Association (WCPA). Heath Schopf’s expertise helped us with all sorts of standards and specs about concrete pavement, traffic projections, specs for concrete dowel bars, other technical details, and developing bids for the concrete and milling work.”

Michels Does Milling, Paving And Painting

Michels Construction, Co., Brownsville, Wis., won the contract for the milling, paving and painting by submitting the low bid of seven presented. The large number of bidders represented the competitive bidding process at its best.

Michels’ first task was to mill an average of 2 inches of asphalt off 73,000 square yards of roadway to create a level profile with a roughened surface that would help the concrete overlay adhere. The milling operation was performed with slope-control equipment that used sensors and a string line. The same string line was used to guide the concrete paving operation, providing an excellent ride and yield control.

The new 7-1/2-inch-thick concrete surface covered two 12-foot-wide driving lanes, two 3-foot-wide shoulders, concrete connectors to some intersecting roads, and 100-foot-long to 200-foot-long deceleration/turn lanes at selected intersections. In all, the paving covered 81,400 square yards of surface with 15,583 cubic yards of concrete. In addition to concrete pavement the project also included 1,500 feet of curb and gutter at intersections.

A longitudinal joint reinforced with tie bars was cut along the center of the roadway, and transverse joints were cut across the pavement every 15 feet. To reinforce the road for heavy truck



Top to bottom: Michels used about 15,500 cubic yards of concrete to pave an overlay 7-1/2 inches deep and 30 feet wide over 4.25 miles of highway.

A tining machine scored the surface of the fresh concrete to improve traction for cars and trucks. Photo courtesy of WCPA.

The new Highway A delivers a smooth ride and additional features like the deceleration/turn lane visible just before the intersection. Photo courtesy of WCPA.

traffic, epoxy-coated steel dowels were installed to transfer loads across the joints. The concrete shoulders, paved along with the driving lanes, also contained epoxy-coated dowels at the transverse joints to increase edge support of the slab.

Schopf says, "Even under heavy traffic, this full-depth concrete overlay with epoxy-coated steel dowels, placed on the established asphalt roadbed, will provide the same benefits as a traditional concrete roadway – an excellent ride, long life and low maintenance."

Minimal Inconvenience To Residents

Re-using the existing roadbed minimized inconvenience to residents living along the construction zone. Because the road wasn't torn out, local traffic could drive on the milled-asphalt base layer until the concrete was paved over it. When possible, residents living along the project helped reduce paving gaps by parking along intersecting roads or by driving along the leveled base course of an unpaved extended gravel shoulder.

Although Michels paved both 12-foot-wide driving lanes and both 3-foot-wide shoulders in a single 30-foot-wide pass, the pavement was cured enough for local traffic to drive on within three days.

Because the milled-asphalt base formed by the existing roadway was unaffected by water, the crew could resume paving the concrete overlay immediately after rain, thereby minimizing overall paving time.

Said Pete Thompson, "We were surprised at how quickly this process went. The conventional wisdom says that asphalt paving is quicker than concrete. In this case, the concrete-over-asphalt process was actually faster."

Using the existing roadbed also helped minimize inconvenience by shortening the overall construction process, compared to removing it and building an all-new road. The initial dirt work started in late April, and the official opening was held August 2.

Finished Early And Within Budget

When all the lines had been painted, the intersections and driveways

connected to the road, and the last landscaping completed, the Dodge County Highway A project had been finished two weeks early and within budget.

Said Assistant Highway Commissioner Thompson, "We are obviously pleased that things turned out so well. The county fairground is at one end of this project and the fair is in mid-August. We knew we had to finish before that. Beating the deadline by two weeks is really nice. The milling work was bid at 88 cents per square yard, the paving

at \$16.39 per square yard and the painting at about \$4,200 per mile. In addition, we allowed another \$800,000 for the work we'd do ourselves. We met the budget in all categories."

Commissioner Brian Field says he sees this project as an excellent cooperative effort between the county's highway department, Michels' crew and the WCPA. "This was a very good project all the way around. Paving concrete over asphalt has given us another good option for meeting Dodge County's highway needs." ■



County Highway A Ribbon Cutting Ceremony held on Thursday, August 2, 2007.





Moving forward with concrete results

WHY CONCRETE?

SAFETY

Visibility – Because concrete reflects light, it increases visibility.

Traction – Concrete pavements provide superior traction. They are built with added surface texture and never rut, eliminating water accumulation and reducing hydroplaning risks.

LOWER COST, HIGHER VALUE

Initial Cost – Because concrete is so strong, concrete pavement requires less construction material, which reduces costs. Concrete can cost up to 15% more to construct, but lasts about 100% longer.

Long-Term Value – Longer life expectancies and minimal maintenance make concrete pavement the best value in the long-term.

Durability – After one month, concrete begins to harden over time. Concrete pavements often exceed their expected lifespan and traffic loads.

Speedy Paving – In as little as 12 hours, concrete pavement can be built and open to traffic—three times faster than asphalt pavements.

Ease of Repair – Concrete's durability reduces the need for maintenance and repairs. When work is necessary, the scope is typically smaller than asphalt repairs.

Fuel Savings – The hard surface of concrete pavement can increase truck fuel efficiency, reducing fuel costs.

VERSATILITY

Flexible Lifespan – Depending on a project's needs, concrete pavements can be designed to last as many as 50 years or as few as 10.

Whitetopping – Placing a thin layer of concrete over asphalt is a fast, cost-effective way to improve old pavements.

Restoration – The lifespan of concrete pavement can be multiplied up to nine times through restoration.

ENVIRONMENTALLY FRIENDLY

Local Resources - Concrete makes use of local materials, not resources from distant parts of the world.

WHO WE ARE

The members of the Wisconsin Concrete Pavement Association (WCPA) are Wisconsin-based contractors, cement and ready-mix producers, manufacturers, and suppliers. WCPA has represented members to industry and the public since 1952. We are recognized as the voice of the concrete pavement industry in Wisconsin. Our office in Madison allows close communication with the DOT. Members receive ongoing communication about the concrete industry through our website, quarterly newsletters, ongoing e-mail updates, and in-person events.

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