

DOWEL BAR RETROFIT FOR THIN SECTION PAVEMENTS



Dowel Bar Retrofit on County Highway 22 in Olmsted County, Minn.

>>> 1-INCH DIAMETER DOWELS ARE A COST-EFFECTIVE WAY TO RESTORE LOAD TRANSFER IN LOW-VOLUME ROADS

IN 2016, Minnesota's Olmsted County Transportation Division initiated a concrete pavement preservation (CPP) project on County Highway 22. The existing roadway consisted of an 8-inch bituminous base with a 6.5-inch concrete overlay. There were no dowel bars in the slab and some of the concrete pavement was experiencing faulting. The county elected to restore load transfer using dowel bar retrofit (DBR).

"Olmsted County used dowel bars in two other projects—one in 2000 and one in 2004—and those are performing well," said Scott Holmes, Transportation Supervisor of Construction & Traffic with Olmsted County Public Works.

But with the thinner-than-usual slab depth of 6.5 inches on Highway 22, the county used 1-inch diameter dowel bars rather than their usual 1.5-inch dowels. Dowels with a 1-inch diameter have proven performance and are well suited for thinner concrete pavement sections; their smaller size allows for the necessary concrete cover to accomplish effective load transfer at the pavement joint. This procedure is partic-

ularly applicable in municipal and county roadway networks where undowelled thin section concrete pavements have been used for years and are now in need of additional load transfer. Smaller dowels have the additional benefit of requiring fewer materials to produce, achieving cost savings while providing the same level of performance for low volume roads.

When dowels are placed in new pavement, they are either inserted using an automatic dowel inserter or they are positioned prior to the pour and held in place using dowel baskets. When used as a retrofit during CPP, dowels must be fitted with expansion caps and seated in chairs to keep them from moving during the backfill operation. The molds and tooling required to manufacture expansion caps and chairs for 1" dowel bar retrofit units did not exist at the time the Olmsted County project bid. However, through coordination between the contractor and the material suppliers, the components were designed, manufactured and delivered on schedule for the Olmsted County job and resources are now in place to produce the dowel bar units for future projects. This improve-

TEAM MEMBERS

- Olmsted County, Minnesota (Owner)
- Diamond Surface, Inc. (Contractor)
- CTS Cement (Concrete Patching Materials Supplier)
- Highway Materials, LLC (Dowel Bar Supplier)

ment in product availability means there is now another tool in the toolbox for owners to use when fixing their thin section, lower volume concrete roadways.

By September 2016 the Olmsted County project was complete with pavement grinding, joint sealing and pavement marking. A total of 26,882 dowels were used and 72,558 square yards of grinding took place.

End users of the finished road noticed the improvement right away, with one citizen emailing the county to say, "I just want to congratulate the county and especially the Diamond [Surface Inc.] crew for the work on 37th Street. That company had the manpower, and the equipment, that got the job done in a[n] exceptional manner without undue disruption of traffic."