# *Oldest* Concrete Street in the United States

## An experimental pavement proved successful, and is still in use today

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Bellefontaine, Ohio, was like many small towns in the 1890s. It was a growing community and had traffic problems. (The traffic was basically buggies, wagons, and horses; cars would not start to appear for at least another 10 years.) Like many small towns, the street conditions depended on the weather. When raining, the streets were muddy, and when dry, they were hard and dusty. Unlike other towns, Bellefontaine had two visionary men, George Bartholomew and James C. Wonders, who were willing to try a new material called artificial stone, or concrete, to solve its problem.

George Bartholomew had moved to Bellefontaine, Ohio, in 1886 after having learned about cement production in Germany and at the San Antonio Cement Co. of Texas. He had found in mid-Ohio almost pure sources of limestone and clay, the main ingredients for the production of cement, and had hoped to bring cement and concrete technology to the Midwest.

After successful experiments in making cement, he started the Buckeye Portland Cement Co. and began promoting the use of artificial stone (concrete). An obvious solution to the muddy and dusty street problems was to use his cement and create a concrete pavement. The city council was skeptical about this concrete pavement. It was concerned that the pavement would not be durable and would abrade as a result of the heavy loads on steel-rimmed wagon wheels.

The city council could find no models of successful concrete pavements. New York City had used concrete as a base course with a wearing course of Macadam and cobblestone, but using concrete for the pavement and the wearing surface was unprecedented.

In 1891, the city council took the first steps in concrete paving to see if this new concept had any merit. It authorized the paving of a small section of a roadway: an 8-ft (2.5 m) strip next to the hitching posts. The experimental concrete pavement proved to be successful and provided a durable roadway free of mud and dust. Still skeptical about embracing this new concept of concrete pavement, the city council took an extremely conservative approach to its next step. It authorized the paving of the square around the courthouse, provided George Bartholomew was willing to donate the cement and post a $5000 bond that guaranteed the pavement would last 5 years.

The construction followed the same techniques that had been developed for sidewalk construction. The slabs were formed in 5-ft (1.5 m) squares with tar paper between adjacent slabs, and a two-layer pavement system was used. The bottom, or base course, was approximately 4 in. (100 mm) and had maximum-sized aggregate of 1-1/2 in. (40 mm) with a water-cement ratio of 0.60. The top, or wearing course, had maximum-sized aggregate of 1/2 in. (15 mm) and a water-cement ratio of 0.45.

The historical marker celebrating the 75th year of service

The mixing of the concrete was done without heavy equipment. The sand, stone, and cement were dumped into a pile, and after mixing the concrete with hand-powered screw mixers, the concrete was tamped into the forms. This mixing-and-placing method entrapped approximately 8% air. The concrete was cured by the continuous wetting of 2 in. (50 mm) of sand for one week; when finished, the strength of the concrete (measured by recent cores) was more than 5000 psi (34.5 MPa). When freezing weather was expected, 2 in. (50 mm) of sawdust was used as an insulating blanket.

This pavement was considered so revolutionary that the Chicago International Exposition of 1893 awarded George Bartholomew First Place for Engineering Technology Advancement in Paving Materials. This was a major accomplishment and helped to lend credibility to this new technique.

James C. Wonders, the Logan County engineer, designed the pavement and provided technical direction for the road construction. Although most of the credit for the first concrete street goes to George Bartholomew, Wonders provided the technical expertise and direction to make it a successful project. Wonders went on to additional successes, becoming the State Highway Commissioner (Ohio) and a road expert for the U.S. Bureau of Public Roads.

In 1991, Bellefontaine had a major celebration honoring George Bartholomew and his experimental pavement that is still in use. The street was later closed to traffic so the town could preserve this historical pavement. This became a political issue with many people who felt that closing this street to vehicles caused parking and traffic problems around the courthouse. After the next mayoral election, the street was opened once again to light vehicular traffic, and is still in use. The statue of George Bartholomew at the end of the street keeps truck traffic from using this pavement.


Monument to the 50th anniversary of the concrete pavement. Folklore states that the full-depth cross section on the sign shows the outline of the State of Ohio

The concrete pavement turned out to be a success. The overall materials and construction costs (excluding the cost of the donated cement and the bond) was $9000, and the maintenance and repair cost for the first 50 years was $1400. Obviously, the bond to guarantee the road for 5 years was really never needed. When you visit the

A piece from the Bellefontaine concrete pavement that shows the full depth (note the two layers of pavement)

The oldest concrete street in the United States as it appears now (the street is still in use)

Statue honoring George Bartholomew for his insight in using concrete pavement. This statue is at the end of the street and limits the use of the street to light vehicles

courthouse in Bellefontaine, Ohio, you can see some of the original concrete pavement still in place and in use, although the concrete pavement does show wear (what wouldn't after almost 110 years of service?). You can also see a statue of George Bartholomew that honors his vision of using concrete as a paving material.

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Selected for reader interest by the editors.


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