



TECH TRANSFER



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FOAMED ASPHALT BASE STABILIZATION IN FORT BRAGG

Foamed asphalt base stabilization is a roadway recycling process in which all of the pavement and some of the underlying material is pulverized and treated with a foamed asphalt additive to produce an improved, stabilized base. In 2004, the Technology Transfer Program printed an in-depth *Tech Topic* report describing the process. Access the report at www.techtransfer.berkeley.edu/techttopics.

In 2006 and 2007, the city of Fort Bragg, California performed a two-phase project using the foamed asphalt process. Fort Bragg is a small, coastal incorporated city in Mendocino County. The project was conducted in two phases over a two-year period on Franklin Street, an urban central business district street serving a variety of land use purposes.

PHASE I

Phase I, built in the fall of 2006, was approximately 4,500 feet in length. Foamed asphalt was only one item of work. Other work items included all underground utilities, curbs and gutters, intersection bulbouts and side street connections. The depth of pulverization on Phase I was initially planned for 12 inches, but was reduced to 8-10 inches due

to higher than expected underground utilities. The project called for two pulverizations with the asphalt and cement injected in the second pass a week after the first pulverization. After the pulverization process, hot mix asphalt (HMA) surfacing was applied.

Fort Bragg's bid item included liquid asphalt (2.5 to 3.0%), water, and cement (1.0 to 2.0%). The price per square foot at the 8 inch to 10 inch depth calculated out to \$1.91 per square foot. The projects described in the 2004 *Tech Topic* identified a pay item for the pulverization process and subsequent finishing and compaction. Those prices ranged from \$0.30 cents to \$0.70 per square foot and did not include the cost of liquid asphalt, water, and cement (or fly ash additive). From a price control standpoint, it is better to break the price down into individual items of work.

PHASE II

Phase II of the project was performed in July and August of 2007 and involved approximately 18,000 square yards of project area. The depth to be foamed was 10 inches and, as in the first phase, was pulverized twice with the asphalt and cement injected in the second pulverization followed by a HMA overlay the next week. The bid price for the Phase II foamed asphalt stabilization process was \$2.33 per square foot.

Work Progression and Project Outcome

Work progressed smoothly on Franklin Street. Road closures were limited to between the hours of 7:00 am and 2:00 or 3:00 pm. Businesses were allowed to remain open with pedestrian access to parking on side streets.

The work space was tight and coordinating equipment movements was critical. Once the pulverization/foaming equipment moved on, the graders, rollers, and compactors performed their function.

Photo 1 shows the pulverization and foam stabilization equipment train during Phase II of the project. Photo 2 provides a close-up of the treated base material. For both phases, Argonaut was the prime contractor and Western Stabilization was the foam specialist.

Dave Goble, Director of Public Works for the city of Fort Bragg, said that he strongly believes the Franklin Street foamed asphalt project will perform well for an extended period of time. The author's inspection of the finished project in August 2007 revealed smooth pavement with no signs of distress.

RURAL USES OF FOAMED ASPHALT BASE STABILIZATION

In the late 1990s, Western Stabilization of Dixon, California conducted informational classes on foamed asphalt stabilization in Northern California. In May of 2000 the company placed several demonstration projects in cooperation with the public works departments of Glenn, Yuba, and Solano Counties.

Caltrans built a project using foamed asphalt in Northern California in 2001 on State Highway 20, approximately 11 miles west of Interstate 5. State Highway 20 is a two-lane, two-way conventional highway crossing heavily irrigated agricultural land. According to Joe Peterson, Caltrans Northern District 3 Materials Engineer, to date the project has exceeded expectations for a maintenance-free life. More than 90% of the roadway has shown no sign of distress, and the only failures have occurred at plugged culverts during severe winter storms.

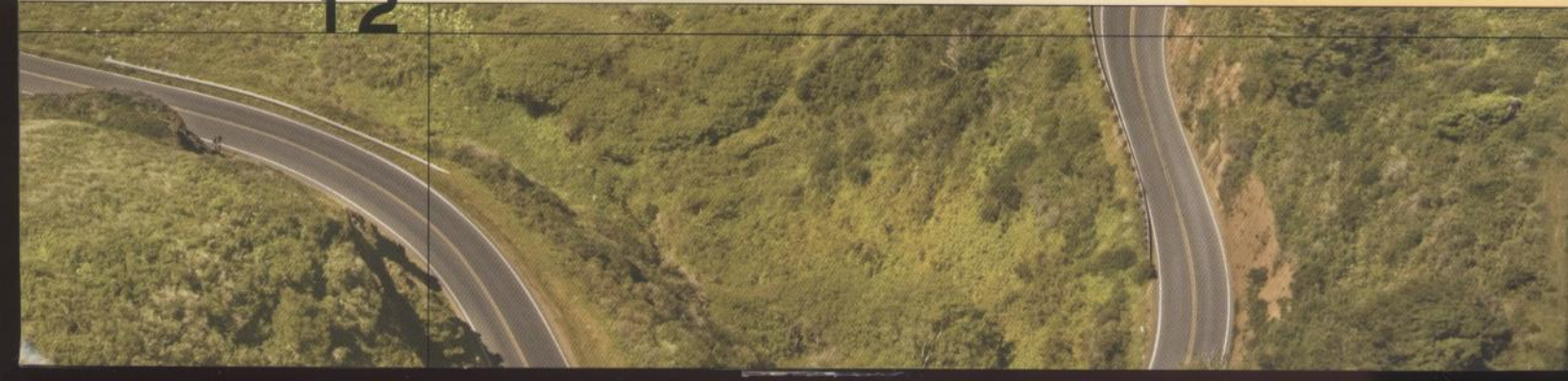




Photo 1: A full train works its way down Franklin Street in Fort Bragg



Photo 2: Pulverized/injected material

WISHING DON RAFFAELLI AN ENJOYABLE RETIREMENT

On April 1, 2008, Don Raffaelli retired from his position as the Technology Transfer Program's Local Technical Assistance Field Engineer for Northern California. As a Field Engineer, he provided free peer-to-peer technical assistance to local transportation agencies in California on request.

Don was the Director of Public Works for Humboldt County for 3 years, and spent the majority of his career working as Deputy Director for Maintenance and Operations and as Traffic Engineer for the county.

Don's career with the Tech Transfer Program spanned more than 30 years. He served as a respected advisor to the transportation departments of many California public agencies and as an esteemed instructor for many of Tech Transfer's courses. During this time, countless cities, counties, and individuals have benefited from his wisdom and experience.