

Colored Pavement for Bike Lanes in Norman, Oklahoma

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The Oklahoma Department of Safety reports that every year, nearly ten bicyclists in Oklahoma lose their lives in crashes with motor vehicles.¹ To increase rates of bicycling for transportation purposes, the most critical and challenging barrier is overcoming a bicyclist's perception of personal safety when sharing a roadway with motorized traffic.²

The Oklahoma Department of Transportation (ODOT) currently requires safe accommodation for pedestrians and bicyclists for all new or proposed Federal-Aid Transportation Projects. This requirement includes improvements for existing transportation facilities.

Furthermore, ODOT currently offers funding to cities for encouraging innovative design, constructing additional bicycle facilities, as well as increasing public awareness and safety for pedestrians and bicyclists.³ Within the past decade, a recent development for bicyclist safety has been the use of colored pavement.

As of 2011, the Federal Highway Administration (FHWA) has defined colored pavement as "colored asphalt or concrete, or paint or other marking materials applied to the surface of a road or island to simulate a colored pavement."⁴

The FHWA considers colored pavement to be a traffic control device. A traffic control device is a sign, signal, marking or other device placed on or adjacent to a street or highway to regulate, warn, or guide traffic.⁵ Colored treatments for bike lanes serve to:

- emphasize conflict areas
- increase visibility for users of the preferential lane
- indicate purpose of the dedicated lane for all users sharing the roadway.⁶

Beginning in 2011, the FHWA granted interim approval to numerous state and local governmental agencies for experimenting with green (chromatic or saturated) colored pavement for bicycle lanes as a traffic control device.⁷

In their Urban Bikeway Design Guide (published March 2014), the National Association of City Transportation Officials (NACTO) chart the advantages and disadvantages of using pavement coatings. These pavement coatings include paint, epoxy mixes, and thermoplastic for constructing bicycle lanes on city streets.⁸

As the least expensive of pavement coatings, paint is most widely used. Paint may contain additives such as sand for skid resistance and reflective glass beads. Since paint wears quickly, it is not suitable for high traffic areas.

In 2008, the Municipal Transportation Agency located in San Francisco, California evaluated green pavement for bike lanes. City officials tested multiple materials to compare durability, ease of application, ease of maintenance, and visibility under varying light and weather conditions. Then they chose a micro surface binder consisting of a colored synthetic bitumen emulsion, with glass beads added to provide retro reflectivity.⁹ Unfortunately, when bike paths get wet, glass beads can be slippery and dangerous.

Colorized Lane Demarcation

Since then, a manufacturer located in Hazleton, Pennsylvania has developed a process called Colorized Lane Demarcation. Instead of using glass beads, the High Friction Surface Treatment (HFST) consists of 100% recycled glass aggregate (with added green pigment) placed over a polymer epoxy binder. HFST uses a high-strength polymer resin for bonding an abrasion resistant high friction aggregate to the pavement surface. The company describes Colorized Lane Demarcation as a durable, fade-free, long-term traffic safety solution for high traffic areas that reduces fatalities and saves lives.¹⁰

Four years ago, Sammamish in Washington State was the first community to use Colorized Lane Demarcation. The vibrant cycling community in Sammamish has emphasized sustainability and safety for bike lanes, especially those located on streets with high traffic congestion.¹¹ Since HFST has rapid cure times, the service provider completed the project in just one day, without disrupting access to commercial properties.¹²

Green Bike Lanes for Norman, Oklahoma

As of September 2015, the City of Norman in Oklahoma installed green bike lanes using Colorized Lane Demarcation. As part of the Cedar Lane Road Widening Project, the bike lanes begin at 12th Avenue Southeast, running alongside the curbs on both sides, extending half a mile east of 24th Avenue Southeast. In the near future, the project will include a railroad at-grade crossing and five-foot sidewalks on both sides of Cedar Lane.¹³



Figure 1. Street Sign for Cedar Lane in Norman.

On 7 October 2015, *The Norman Transcript* interviewed a member of Norman’s Bicycle Advisory Board. Michelle Carr referred to the number of bicycle collision fatalities in the City of Norman.¹⁴ Norman cyclists are hoping the bright green five-foot-wide bike lanes will increase awareness.



Figure 2. Road crew installing green bike lanes on Cedar Lane in Norman, Oklahoma

The treatment specification requires placing a trial HFST on asphalt concrete pavement, then testing for a 0.65 coefficient of friction.¹⁵ Manual application of HFST is possible, but mechanical application of HFST with dispensing vehicles results in a more uniform and durable surface less prone to material failure.¹⁶

The service provider customized an automated application vehicle that evenly spreads the polymer resin binder over the road surface nearly 1.4 millimeters (or 55 mils) thick. Within seconds, the vehicle uniformly spreads the high friction aggregate over the binder.¹⁷

As the application vehicle spread the binder over the asphalt, then laid the 100% recycled glass aggregate over the binder, the service provider ensured the Portland Concrete near the curb retained its original surface.



Figure 3. Dashed line indicates possible conflict area, where motorists must yield to bicyclists.



Figure 4. Class III bike lane as it approaches railroad crossing.

Once the polymer resin binder has cured, a vacuum sweeper removes the excess aggregate. Then, the recovered aggregate is recycled and reused.¹⁸

The street with the pedestrian crossing serves as an entrance to a housing development located in south east Norman.

This well-designed street lane with the large thermoplastic arrow provides plenty of notice to motorists and bicyclists alike that the outermost lane is narrowing and the Class II green bike lane will soon end in the rural area.

Located near student-focused apartments, the project will eventually connect bicyclists to the nearby Oklahoma University campus.



Figure 5. Green bike lane located in southeast Norman.

In Norman, City Transportation Engineer Angelo Lombardo explains that the city did not want to paint the lanes every year. Lombardo hopes this cost effective and durable option will become the standard. Once planned projects are complete, Norman will have nearly seven miles of green bike lanes.¹⁹

Federal Funding

The FHWA classifies HFST as a low-cost safety solution. Under the Highway Safety Improvement Program (HSIP), the federal government grants funds to State Departments of Transportation. Then, the DOT in each state administers the funds to local governments. Each local government using HFST in their jurisdiction qualifies for 90% federal funding for their bike lanes.²⁰

Since current estimate for material is \$3.00 per square foot, Colorized Lane Demarcation offers promising long-term durability at a low price. Overall, Colorized Lane Demarcation seems to be an economical and effective safety solution for many cities within Oklahoma.

Resources

For more information concerning Transportation Enhancements at ODOT, go to http://www.okladot.state.ok.us/projmgmt/enhance_prog/index.htm

For local governments seeking information concerning Colorized Lane Demarcation, go to <http://www.dbiservices.com/High-friction-surface-treatments-a-cost-effective-strategy-that-saves-lives>

For local governments seeking information concerning federal funding, go to http://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.cfm
<http://safety.fhwa.dot.gov/hsip/>

DBi Services Global Leader in Infrastructure Operations and Maintenance: Colorized Pavement Demarcation.

Go to <http://www.dbiservices.com/demarcation-colorized-pavement> ; accessed 2 October 2015.

For technical data sheet, go to <http://www.dbiservices.com/sites/default/files/resources/Texas%20HFST%20Spec%202015.pdf>

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- ³ Transportation Enhancement Program Enhancement Categories. Go to http://www.odot.org/projmgmt/enhance_prog/index.htm; accessed 17 August 2015.
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Go to <http://nacto.org/wp-content/uploads/2010/08/Evaluation-of-Solid-and-Dashed-Green-Pavement-for-Bicycle-Lanes.pdf>; accessed 5 October 2015.
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