

Report 27-R07: Long-Term Maintenance Needs and Costs of Green-Colored Pavement Markings and Flexible Post Delineators

Background

In recent years, Virginia localities have expressed interest in installing two specific bicycle infrastructure elements: green-colored pavement markings (GCPMs) on bicycle facilities and flexible post delineators (flexposts) along separated bike lanes to improve conspicuity and safety. In some cases, these elements were pursued as part of quick-build safety improvements. The Virginia Department of Transportation (VDOT) lacked information on the long-term maintenance costs for these infrastructure elements.

Research Objectives

This study aimed to determine the costs, frequency, and necessary labor and equipment for maintaining two elements of bicycle and pedestrian infrastructure within Virginia: GCPMs and flexposts. The scope included various contexts (i.e., large metropolitan, small metropolitan, and rural areas). Flexpost applications for channelizing motor vehicle traffic were outside the scope. This study reviewed the effect of facility design on maintenance needs and costs, but crash analysis was outside the scope.

Approach

To fulfill the study purpose, the research team conducted a literature review, a screening survey of the nine VDOT districts and Virginia localities that independently maintain their roads to identify locations of GCPMs and flexposts used in bicycle or pedestrian infrastructure, and indepth interviews regarding the materials used and their applications, along with maintenance costs, frequency, labor, and equipment. Then, the researchers conducted four Virginia case studies that reflected a variety of facility types and geographic diversity.

Outcomes

Flexpost maintenance costs varied as a function of facility length, pavement condition, and number of flexposts needing replacement, with annual per-mile costs ranging from \$1,910 to \$4,585 based on three case studies. Expected GCPM replacement frequency ranged from 2 to 7 years, depending on the type of material, with one case study suggesting an annualized per-mile maintenance cost of \$4,000 for 24 GCPMs in standard bike lanes. The study recommends that VDOT track GCPMs and flexposts and incorporate the maintenance implications of GCPMs and flexposts into agency guidance materials.

Research Benefits

Implementing the study recommendations would give decisionmakers better information on total costs (installation and maintenance) for GCPMs and flexposts. The study estimates that during a 5-year period, these benefits could reach \$600,000, primarily based on crash-reduction benefits (where these devices are productive) but also considering locations where, because the devices will not be maintained, the cost savings arise from not installing them.

Principal Research Scientist

Janna Brown
*Graduate Research
Assistant*

Co-Authors and Partners

Peter B. Ohlms
Senior Research Scientist

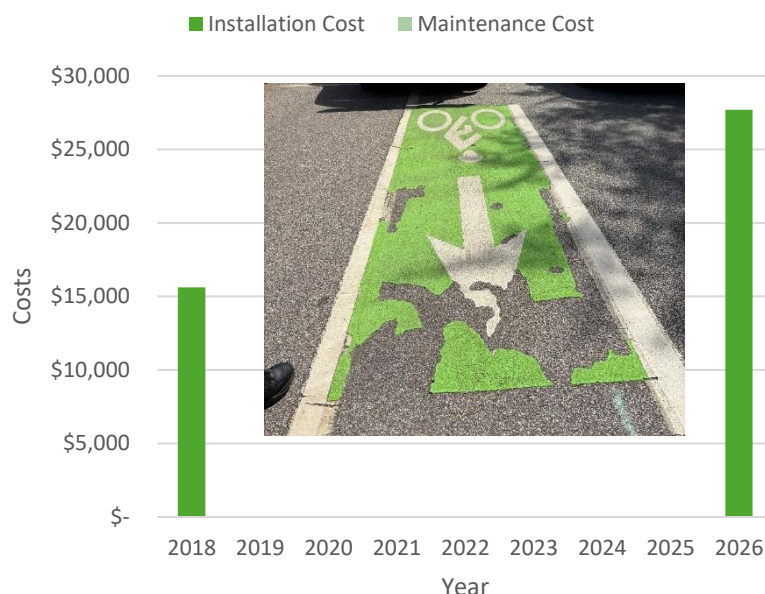
T. Donna Chen
Associate Professor

Research Findings

Green-Colored Markings

Day-to-day maintenance costs were zero or negligible. Costs to replace GCPMs at the end of their service life are similar to original installation costs, after accounting for changes in construction costs. GCPMs in areas with high vehicular traffic volumes and within the wheel path for turning vehicle movements might require earlier replacement.

Estimated Installation and Maintenance Costs for GCPMs in Danville



Flexposts

Agencies should expect needing to replace flexposts twice per year, on average, and clearing debris might require some staff time.

Using flexposts to convert standard bicycle lanes to separated bicycle lanes could halve bike-crash numbers, so such a conversion on corridors with any bike crashes will have a positive benefit-cost ratio, even after accounting for maintenance costs.

Estimated Installation and Maintenance Costs for Flexpost-Separated Bicycle Lane in Arlington County

