

## Study of Low-Impact Markings



A wide variety of paints, materials, and techniques were tested and characterized in an effort to identify products and methods that can be used for temporary utility marking. If marking materials can dissolve or fade to acceptable levels, they would eliminate the cost involved in a return visit to remove the markings.

### *Project Description*

An increasing number of localities are considering regulations which would require utilities to remove paint or other markings made by utility crews when locating facilities, responding to “one-call” situations, and conducting other operations activities. Some initiatives are calling for the removal of markings within 15 to 30 days from the initial application. However, when an additional trip is required to remove these markings, it is a major additional expense as the cost to remove the markings often exceeds the cost involved in the original marking activities.

While numerous temporary paints and coatings are being marketed, researchers found little information available as to their performance under various conditions. Generally, the manufacturer provides only a blanket statement (e.g., “lasts up to 30 days”) without further qualification or elaboration. The lack of such data creates the risk that markings will either fail prematurely or endure too long.

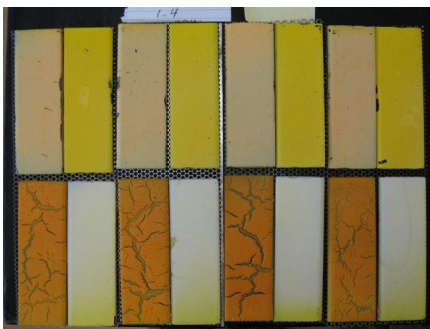
The objective of this project was to test and characterize temporary paint and other marking/marketing-removal techniques that would eliminate the need for return visits to remove the markings.

### *Deliverable*

Testing results are presented in a detailed report that allows users to identify the most appropriate marker type for a given environment to achieve the desired marking duration. The report also identifies alternative techniques that will reduce the cost or eliminate the need for return visits to remove markings.

### *Benefits*

The results of this research will allow utility companies to select the most appropriate paint or marker type for individual job sites based on several parameters, including season and environment. Using a paint that



*Paints were subjected to numerous evaluations through UV testing, water immersion, vehicular testing, and other examination techniques.*

fades to an acceptable level eliminates the need for a utility company to return to a job site to remove the markings and will provide significant cost savings. Additionally, an improved public and customer perception will likely result from the elimination of paint markings that last excessively long periods of time.

### *Technical Concept & Approach*

The primary focus of this study was to test and characterize paints and materials that have the potential to provide “temporary” markings.

Paint and coatings – whether temporary or permanent – were subjected to a number of different degradation mechanisms, including vehicular testing, UV fading, water immersion, and others. Surface conditions and the severity of the environment can lead to different degradation rates of the same coating. For example, a coating that has adequate resistance to degradation on an asphalt road in a suburban residential area might wear prematurely on concrete in a busy commercial district. Similarly, a coating that fades quickly in June from high UV levels might last substantially longer during the winter months.

In this study, researchers tested and ranked various temporary coatings for expected durability on various substrates (asphalt, concrete, etc.), under a range of environmental conditions. In addition, cost and application requirements were addressed.

Different removal techniques were also tested. Power washing is currently the most common method among utilities, but is not desired due to noise pollution and high cost. Other removal methods, in addition to power washing, were tested on the marking paints.

In addition to evaluating the characteristics of various paint types and removal methods, researchers studied alternative marking and marking-removal techniques.

### *Results*

This project began with a literature search, industry survey, development of a testing protocol, and the selection of mark-out paints for testing. Marking paints for this project were selected based on the industry survey and research of commercially available products. In addition, a marking tape was also selected for testing.

Based on the industry survey, researchers developed a test method to incorporate the most significant factors that determine a marking’s life in the field. Five main tests were conducted: accelerated weathering (UV exposure), water immersion, removal methods, traffic

wear, and abrasion. Objective color evaluations of markings during accelerated-weathering and water-immersion tests were made using a hand-held colorimeter. Removal methods, vehicular testing, and abrasion were evaluated based on visual inspection. Eleven different paint products and one marking tape were studied.

Three different UV tests were performed. Testing was performed using UV-B bulbs at 70°C. Samples were rotated through different positions at each measurement interval.

An impermanence rank was calculated for each test on the markings based on ultraviolet exposure, water immersion, abrasion, and removal methods. An average impermanence rank of all tests was calculated and then used to create a rank chart.

Three removal methods were tested: power washing, brushing with isopropyl alcohol, and brushing with a commercial spray paint/graffiti remover.

Two different traffic wear tests were performed at Gas Technology Institute’s Pavement Load Testing Facility. The first round of testing simulated a load of a van, whereas the second simulated the load of a compact car. A total of 25,833 wheel passes were made over the paints during the first round, and 23,065 wheel passes were made for the second round of testing.

### *Status*

This project was completed in 2011. Research results were detailed in a report to project sponsors.

In summary, experts note that, when choosing a marking paint, it is important to know the environmental conditions in which it will be used.

One limitation of this study is that it cannot be determined whether or not a marker will last a specified number of days in the field. This is due to the variety of environmental conditions in the field. However, if the environmental conditions are known for an area, then one may refer to a rank chart column in the report that pertains to the known weather.

*For more information:*

***Maureen Droessler***

Program Administrator

Operations Technology Development, NFP

Phone: 847/768-0608

[maureen.droessler@otd-co.org](mailto:maureen.droessler@otd-co.org)

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