

# Thataway Again, an Evaluation of an Anti-Graffiti Coating for Outdoor Painted Steel Sculpture



This sculpture *Thataway Again* is an outdoor painted steel sculpture by Canadian artist Henry Saxe. *Thataway Again* is enjoyed by many students, faculty and residents on a regular basis as it is located in a high traffic area.

## Introduction

As sculptures in urban areas begin to deteriorate they can attract vandalism. A research project conducted by Laurence Gagné in 2014, an outdoor sculpture conservator, identified graffiti vandalism as an extensive and pervasive issue impacting outdoor public art. Regular maintenance and quick removal of graffiti are recommendations for limiting further graffiti applications.

This sculpture last received maintenance in 1992. To assist with maintaining the sculpture in optimal condition, the application of an anti-graffiti, anti-soiling coating would extend intervals between regular maintenance by adding a layer of protection from soiling, biological activity and airborne pollutants, as well as possible vandalism.

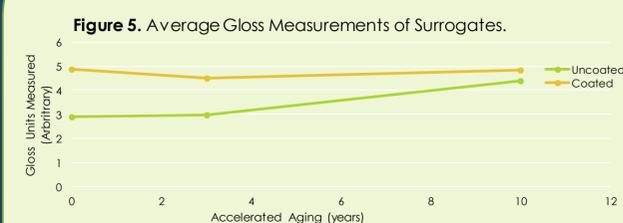
A comprehensive treatment proposal for *Thataway Again* has been compiled considering the use of a sacrificial polysaccharide anti-graffiti coating, PSS 20. Testing was conducted to evaluate PSS 20's properties, and determine if they were suitable for a painted steel substrate. Evaluation criteria included if PSS 20 would be visually perceptible on the surface of primed metal. Would PSS 20 change the colour of the painted metal surface? How would aging impact the efficacy of graffiti removal after three and ten years?

## Experimental

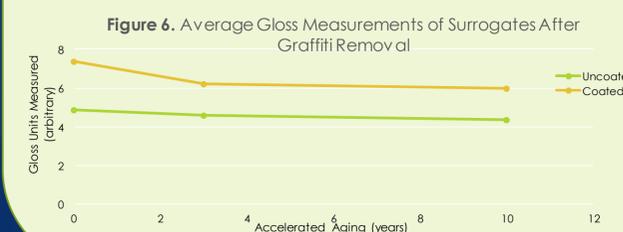
Application of blue felt sharpie marker to the unaged, 3 year and 10 year accelerated aged surrogates was done using a template to ensure consistent applications of marker. This medium is consistent with ASTM Standard D6578/D6578M – 13 for graffiti application. The graffiti was applied on the PSS 20 coating and on the primed metal without an anti-graffiti coating. Graffiti removal was undertaken with the PSS 20 manufacturer's recommendations of warm water and a pressure washer at 20 bar. Surfaces were examined with optical microscopy to evaluate possible abrasion of the paint surface and penetration of graffiti materials.

The surrogates were measured with a Spectrophotometer (Konica Minolta CM-700d portable spectrophotometer with an 8-mm target mask) capable of D65, CIELAB 1976 measurements, consistent with ASTM Standard Practice for Determination Graffiti Resistance D6578/D6578M – 13. Gloss meter measurements were taken using a BYK Gardner Model 4520 Micro Tri-Gloss Portable Gloss Meter, on both the coated portion and the uncoated portion of all of the surrogates. The gloss meter measurements can differentiate small changes in gloss reflectance. The gloss meter was critical to determining to what degree the PSS 20 created a noticeable gloss change when applied to a primed metal substrate, and how the gloss levels changed over the 3 and 10 year accelerated aging periods.

## Results



The surface of both coated and uncoated substrates exhibit greater gloss after removal of the graffiti. These measurements exhibit less variation over the course of time.



Graffiti removal could have further abraded the surface of the surrogates causing higher gloss measurements. Thinning of the primer on a metal substrate could allow for higher reflectance from the underlying metal substrate contributing to the elevated gloss readings.

## Conclusion

It was hypothesised that graffiti removal would be less over time. Optical microscopy was used to examine the surrogate surfaces. Unaged, three years of aging and ten years of aging were monitored with the assumption that there would be declining performance in the PSS 20. The results would indicate that the opposite occurred. The surrogates which had been aged to equal ten years had less graffiti residue after removal as seen in figure 7.

The colour change and gloss change observed in the unaged samples was minimized over time. As the primer layer aged, the uncoated surrogates allowed for more graffiti to be removed. The ten year surrogates out performed with graffiti removal; under microscopic examination there was little evidence of remaining ink particulate. The colour change and gloss change were least visible and had smaller values of change with the ten year surrogates.

## Surrogate Preparation



- 15 x 6 x 2 cm Carbon Steel Surrogates (15)
- Applied Tremclad® 254894 Red Oxide Rust Primer
- Applied PSS 20 to 1/2 of Surrogates
- Applied Sharpie blue ink permanent marker
- Graffiti removal was attempted following manufacturers recommendation



Figure 1) 10 year accelerated aged surrogates before graffiti removal

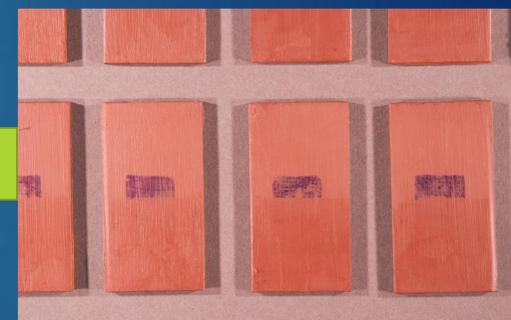


Figure 2) 10 year accelerated aged surrogates after graffiti removal

Figure 7) Optical microscopy showing 3 year and 10 year aged surrogates after graffiti removal. More graffiti was removed after 10 years

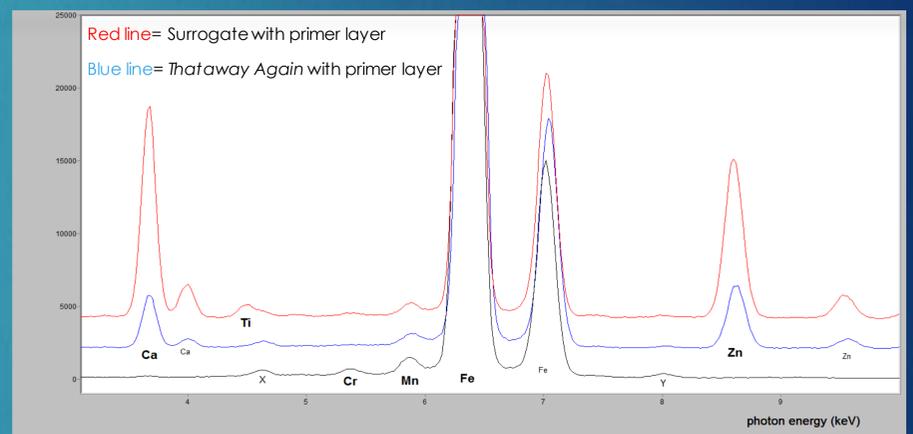
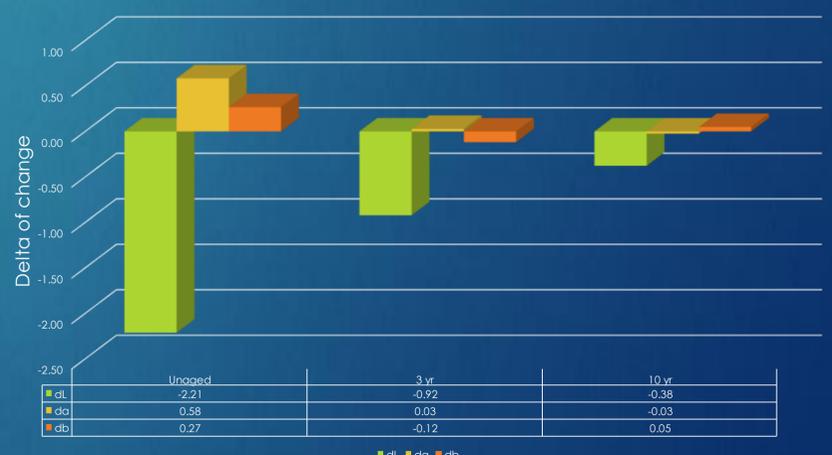


Figure 3) XRF analysis determined that the surrogates seen in the red trace has the same elemental spectra as the sculpture *Thataway Again* seen in the blue spectra. Calcium peaks, and zinc peaks are as a result of the primer layer. The same iron (Fe) peaks are seen in both. There is a small amount of magnesium (Mn) in both. This demonstrates the suitability of the surrogates to reflect the sculpture when undergoing accelerated aging and the same responses as the sculpture.

### Spectrometer Measurements



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